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## THE DIGESTIVE DISORDERS OF ARTIFICIALLY-FED INFANTS.[1]

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The title of this paper should be amended to read "Nutritional Disturbances," as it is a more comprehensive and accurate description of the conditions under consideration. A brief review of the various phases through which the science has advanced, will help us to appreciate the significance of recent developments and the newer nomenclature.

Early attempts at a systematic grouping of these infantile ailments were on a pathological basis. The apparently well baby was considered in a class apart and of no special interest until he developed one of the carefully docketed pathological conditions. If he vomited, he had gastritis; if he had some diarrhœa, it was an enteritis and if he had some of both, it was gastro-enteritis and so on. The clinical pictures were often elusive and ill-defined and the pathological findings frequently nil. The disappointing results of *post mortem* research tended to discourage the investigators and the next attempt, headed by Escherich, sought to establish a bacterial basis for classification. Again the results were largely negative, although much valuable work on the intestinal flora was accomplished. Czerny and Keller, then introducing the term "disturbances of nutrition," offered a classification founded on ætiology under two main headings, *viz.* (1) food injuries, (2) infections; while such additional factors as constitution and environment were also taken into account.

This was a great advance, as it emphasized the importance of food injuries and the involvement of the whole organism, although the trouble starts in the digestive tract. The fault lies not only in digestion, but also in absorption and metabolism. The wasting child will continue to waste in many cases with no obvious signs of indigestion and the most careful feeding, too, often fails to arrest the decline. Can this be explained by anything other than inefficient absorption and metabolism? The gastro-intestinal manifestations are striking and important, but they are signs only and not the disease. Unlike the common adult diarrhœas, there is a general derangement of the basic function of nutrition. The baby is sick, not only its alimentary canal.

Finkelstein, meanwhile, was attacking the problem from the clinical side. He observed the bewildering diversity of symptoms that threatened at first to defy attempts at co-ordination. The state of the motions, pulse, respiration, temperature, urine, skin, muscles, nervous system, etc., seemed kaleidoscopic in infinite change. The weight curve, however, proved common to certain definite clinical entities, the one thing constant representative of the baby as a whole, and hereon his classification was reared. He was able to draw four convincing general pictures:—

(1) *Weight Disturbance.*—The mildest stage of nutritional disturbance when the child, though not very sick, is not thriving and fails to gain weight. It is usually associated with absolute or relative intolerance for fat.
(2) *Dyspepsia* (mild gastro-enteritis).—Moderate gastro-intestinal symptoms with some diarrhœa, vomiting and fever; gradual loss of weight, associated with lessened fat and carbo-hydrate tolerance.
(3) *Decomposition* (marasmus or atrophy).—A chronicly sick baby with malnutrition and emaciation; prolonged, steady loss of weight.
(4) *Intoxication* (acute gastro-enteritis).—Rapid loss of weight, high fever, marked diarrhœa and vomiting; disturbed consciousness.

Having arrived at a simple, yet comprehensive, clinical grouping, the causal agents were next sought. With Czerny he found that constipation and failure to gain weight were often due to excess of fat. He also demonstrated that overfeeding with sugar could produce diarrhœa. As a result of these discoveries he tried to account for all the conditions comprised in his four groups on a food basis, but was only partially successful. He saw them as the gradual development of an increasing intolerance for food; from the mildest disorders, through the various stages to the final tragedy of intoxication, when the infant was in a state of metabolic bankruptcy. He considered it one increasing process in which the infant can tolerate less and less food, until at last any food at all is harmful.

Incomplete as such a finding was, he was able to establish the fact of food injuries being due to:—

(1) Underfeeding, by a generally restricted or improperly balanced diet.
(2) Overfeeding, with a food of proper or improper proportions.
(3) Lessened tolerance for food.

Other factors obviously had to be taken into account, such as developmental defects, bad hygienic surroundings, heat, abnormal bacterial fermentations, etc., and eventually the following ætiological classification was formulated:—

(1) Nutritional disturbances.
(2) Infectious diarrhœas.

The latter must be dismissed in a few words, as it is not the subject of my paper. True infectious diarrhœas are relatively infrequent in Sydney, but are usually severe and often fatal. They are characterized by sudden onset, scanty motions containing blood and mucus from which the dysentery or gas bacillus may be obtained, high temperature and rapid collapse.

### Nutritional Disturbances: Causes.

*A.* Food.
(1) Good food may be pure, fresh cow's milk.
*I.* Overfeeding.
(*a*) Too great quantity.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on October 31, 1919.

(*b*) Too much of particular elements, *e.g.*, fat or sugar.

*II.* Underfeeding.

(*a*) Insufficient quantity.

(*b*) Insufficient of particular elements, *e.g.*, fat or proteins as in condensed milk.

(2) Spoiled food, *e.g.*, milk contaminated by dust, flies, etc., conveying germs.

*B.* Constitution.—Lack of development, inherited individual variations in digestive functions, lowered vitality from heat or bad hygienic surroundings.

*C.* Parenteral Infections (with secondary diarrhœas).—Colds, bronchitis, otitis, cystitis, reacting with diarrhœa.

Among predisposing causes may be mentioned congenital debility, syphilis, tuberculosis and neurotic inheritance. The prolonged heat of summer and bad hygienic surroundings may act as predisposing causes, by lowering the infant's resistance and reducing its digestive capacity may prepare the soil for nutritional disturbances. Bacteria are tenants of the intestine at all times after birth, but they are apparently harmless when digestion is normal. During the heat of summer all the vital functions are depressed and digestion is slower. Milk is a perishable article, particularly when contaminated, readily permitting of fermentation and putrefaction. The long sensitive intestinal tube still in the stage of development for its highly specialized duties, is an easy victim for bacterial and chemical influences. Breast milk is the one and only right food for a baby; it is readily absorbed and metabolized and probably contains natural antibodies and protective ferments, giving a maximum of energy and resistance to infection. The precise part played by the food accessories or vitamines is not yet determined, but we know they are excreted in urine and fæces and in diarrhœal conditions the loss may be excessive, perhaps dangerously so, when the intake is restricted.

Apart from breast milk, anything that is put into an infant's stomach is a foreign substance, which may promote digestive disaster. Even the purest cow's milk may play havoc; how much more then, milk that is unclean, stale and swarming with organisms? Chapin says: "The milk that is supplied to our cities frequently contains more bacteria than is present in the city's sewage and in the case of unusually bad samples of milk, the bacteria outnumber those which are found in the worst sewage."

Before considering the four clinical groups of Finkelstein in greater detail let me emphasize three main points:—

(1) The most important ætiological factor is food, often perfectly good wholesome food, but given in wrong proportions or quantity. The same applies to irregular or too frequent feeding. The mode of action may be lowered tolerance, irritation of the mucosa or absorption of toxic products. The influence of infection, constitution and environment is not denied, but food can act as a poison on account of an abnormal fate during intermediary metabolism, when the nutritional function is deranged without any special intervention of bacteria.

(2) The baby as a whole is sick. The motion is only one among a complexity of guiding signs.

(3) The well baby can so swiftly become the sick baby by wrong feeding or neglect that we must concentrate our efforts on keeping him well and treat by prevention rather than cure.

### Weight Disturbance or Failure to Gain.

The child's condition is below par; he is not very sick, but is not getting on well. He is often fat, flabby, pale and liable to eczema. The urine is ammoniacal and may scald the groins. Constipation is usually present; the motions are dry, greyish and offensive and there may be particles of soap curds in them. It occurs mostly in the winter months and among the wealthier classes. Those cases due to relatively high fat content of the food are not seen so frequently now-a-days, since the fashion for excessive cream and top-milk mixtures has gone out.

#### *Causes.*

(1) It may be due simply to insufficient food, when increase of the quantity or quality will bring about cure.

(2) It may follow lowered food tolerance, due to intercurrent infections, such as coughs, colds, otitis, etc., or congenital or acquired digestive incompetence.

(3) It may occur where there is a relative overfeeding with fat and a relative underfeeding with carbo-hydrate. Excess of fat or protein in the presence of deficient carbo-hydrate may cause constipation with formation of soap stools, with increased excretion of alkalies, chiefly calcium and sodium. Carbo-hydrates prevent these changes by rendering the intestine acid; they also energize needy tissues so that fat metabolism is speeded up. As Naunyn says: "The fat burns in the fire of the carbo-hydrate."

#### *Treatment.*

(1) Breast milk, if possible.

(2) Reduce the fats by using skimmed milk and increase the carbo-hydrates. Cane sugar is satisfactory, but liable to be too sweet in high percentage. Malt sugar in some form is usually preferable, *e.g.*, malt extract, Keller's malt soup, Mellin's food or starch thoroughly dextrinized with taka-diastase. Gradually attempt a return to the fats as tolerance is regained.

(3) Purgatives should be avoided. Petroleum emulsion or small quantities of milk of magnesia are permissible at first. Massage of the colon is helpful in older babies.

To summarize, if a constipated baby is not gaining weight on a well-regulated diet, try a cautious increase to ascertain if it is being underfed. If this is not a success, decrease the fats and increase the carbo-hydrates.

### Dyspepsia.

Dyspepsia is due to overfeeding with one or all of the food constituents; it is characterized by colic, vomiting, diarrhœa, rise of temperature and loss of weight, a common condition among the breast-fed also.

*Causes.*

It is usually brought about by irregular or too frequent feeding, especially when there is excess of sugar, as in condensed milk. Too much fat in the food, particularly in hot weather, may lead to it. Other causes already discussed under general ætiology are largely responsible. Abnormal fermentations are set up which over-activate the motor and secretory functions of the intestine and give rise to the symptoms. Recovery will not occur until food is cut down to a minimum. Food tolerance is lessened and a paradoxical reaction results from increased intake; the weight goes down instead of up. It is an interesting fact shown experimentally that carbo-hydrates added to concentrated whey of cow's milk induce diarrhœa, but how or why is not yet understood.

*Symptoms.*

Vomiting, diarrhœa and flatulence, which may appear singly or collectively, but are not usually severe. Vomiting, when present, as a rule is sour and curdy. The motions vary from 3 to 6 in 24 hours and are usually green, with mucus and curds. Flatulence and colic cause pain and restlessness. The skin is pale, the weight tends to diminish gradually and the temperature may be raised. Severe general symptoms are the exception. Unless promptly treated it is liable to result in decomposition or intoxication.

*Treatment.*

(1) Breast milk, if available, at long and regular intervals.

(2) Secure physiological rest after a preliminary purge of castor oil, by offering only boiled water, tea or fresh barley water sweetened with saccharin for 24 hours. Greatly reduce the total amount of food, lessen the whey and fat and supply slowly-fermentable carbo-hydrate (maltose). Give a skimmed milk and water mixture, starting with 30 c.cm. of skimmed milk to 500 grammes body weight in 24 hours. For instance, a baby weighing 5 kilograms will have 300 c.cm. of skimmed milk, with equal parts of water or barley water, in 8 feeds of 75 c.cm. each. Skimmed milk powder should be almost as effective as fresh.

(3) The skimmed milk is increased at the rate of 28 to 56 c.cm. a day until 45 c.cm. per 500 grammes body weight is given in 24 hours. Some form of less-fermentable carbo-hydrate (maltose) is cautiously added, working up to 5%, under guidance of the weight chart rather than the motions. Cane or milk sugar should be studiously avoided.

(4) Well-made albumin milk is also valuable.

(5) Gradually return to normal feeding by replacing 30 c.cm. of skimmed or albumin milk with a like amount of whole milk, fresh or dried.

(6) Drugs are of secondary importance. *Sodii bicarb.*, milk of bismuth and animal charcoal are useful.

(7) General treatment is obvious, *e.g.*, sufficient rest, warmth and fresh air and ample water. Stimulants may be necessary.

**Decomposition (Marasmus or Atrophy).**

This is a chronic state of malnutrition, characterized by emaciation, sub-normal temporature and a greatly lowered resistance. The chronic infections such as syphilis and tuberculosis also produce a similar picture and must be excluded for therapeutic purposes.

*Causes.*

This condition almost always starts before the third month and is dependent upon pre-existing nutritional disturbances. It is usually seen among poorer families with bad hygienic surroundings and in the winter months. Prematurity and prolonged condensed milk or starvation diet predispose to it. The constantly increasing failure of the power of assimilation and metabolism causes a changed condition of the whole organism with actual cellular disintegration. There is a progressive intolerance for fat, then sugar and, finally, practically all artificial foods. The abnormal splitting of fats and sugars causes excessive acidity, to neutralize which the tissues are deprived of their salts. Pathological research has failed to support the older view that this condition was a state of inanition, resulting from chronic inflammation of the intestinal mucosa, with consequent failure of digestion and absorption.

*Symptoms.*

Emaciation is always present; in severe cases the child is a mere skeleton and looks like a tiny, wrinkled, old man. The weight far below normal, is stationary or diminishing. The child is restless and irritable and may "winge" for hours. The skin is pale or muddy, the pulse is usually slow and the temperature sub-normal. Motions are variable, depending upon the nature of the food given and may be more or less normal. Œdema and purpura may appear and the baby is very susceptible to slight infections. Collapse is liable to occur suddenly and without warning.

*Treatment.*

The only satisfactory form of treatment is prophylaxis, by preventing weight disturbance and dyspepsia and handling them properly when they happen. Above all let us first master the intricacies of correct breast feeding, so that we are competent to instruct and encourage mothers in the supreme art of motherhood. Once developed, it is extremely difficult to treat; it is a chronic condition, liable to acute disasters.

(1) The initial starvation on boiled water, tea, barley water or panopepton should never exceed 12 hours. We must give food and be guided by the weight chart and not by the state of the motions. General treatment, such as rest, warmth, stimulation, etc., is as for other intestinal disorders.

(2) Breast milk is the only really reliable food.

(3) If wet nursing is impracticable, we are compelled to use an artificial food. Give skimmed milk or albumin milk, adding slowly-fermentable carbohydrate (maltose) as early as possible.

(4) Skimmed milk, 30 c.cm. to 500 grammes body weight in 24 hours, sweetened with saccharin, the bottle being offered every 3 hours. This is rapidly increased to one and a half and 60 c.cm. per 500 grammes weight in 24 hours. Malt food, malt extract or dextrinized starch is added, being worked up to 3%. Protein may be supplied in the form of casein powder or a medicated casein, such as neurogen.

(5) Fat is cautiously added by substituting 28 c.cm. whole milk (plain or peptonized) for a similar amount of skimmed, gradually increased to the point of tolerance.

(6) Albumin milk is employed in like manner, but has the additional advantage of permitting the use of much higher percentages of carbo-hydrates.

(7) The hormones or "chemical messengers," such as secretin, may prove of value. My experience with "elixir secretogen" is encouraging, but too limited for definite conclusions.

### Intoxication (Acute Gastro-Enteritis).

This is an acute affection characterized by sudden onset, with collapse and nervous symptoms, fever, diarrhœa and vomiting, occurring most frequently in the summer months and in artificially-fed children living in poor hygienic surroundings.

#### *Causes.*

The ætiology is extremely complex, but there are two main aspects, *viz.* (1) the food injury or chemical and (2) the bacteriological. Heat, bad hygienic surroundings, contaminated food, etc., predispose to it by their detrimental effect on all the alimentary and systemic tissues. While abnormal bacterial activity undoubtedly plays a leading rôle by elaboration and absorption of toxic products, I wish to direct your attention rather to the chemical side of the question.

Previous digestive disorders pave the way for intoxication; it practically never comes out of a clear sky. If, during the stage of dyspepsia we continue to give ordinary foods, the weight, instead of increasing, drops suddenly—the paradoxical food reaction.

In dyspepsia the acids merely irritate and cause diarrhœa without general symptoms. A continuance of the process causes a break through of the defences of the intestines and poisonous non-digested or partially-digested food is allowed to pass unchallenged. The great loss of water from the intestines and lungs further increases the concentration and toxicity of these abnormal products of metabolism. In addition there results a relative acidosis following excessive loss of bases, principally calcium and sodium. All these factors probably exert their influence in combination, *viz.*:—

(1) Toxic products of intermediary metabolism.
(2) Relative acidosis.
(3) Abnormal bacterial activity.

The latter alone will not explain the symptom in many cases for the following reasons:—

(*a*) Cases often clear up immediately food is withheld.
(*b*) Relapses are common when food is given again beyond the point of tolerance.
(*c*) It occurs when aseptic milk is used.
(*d*) No characteristic flora and conclusive pathological evidence are obtained from the intestines.

#### *Symptoms.*

There is a sudden onset, usually with high temperature, vomiting and diarrhœa. The loss of weight is rapid and often very great. Collapse and convulsions are frequent and the nervous and general symptoms may outweigh the gastro-intestinal. The pulse and respiration rates are rapid and tend to follow the temperature. Vomiting usually does not persist, but diarrhœa is profuse and frequent, as a rule. The urine may contain albumin and sugar. The skin is dry and pale, the eyes sunken and dull, the general state relaxed and semi-comatose.

#### *Treatment.*

(1) Stop food and supply water. Physiological rest by starvation for 24 hours. The preliminary purge of castor oil or calomel is not necessary if the stomach and intestines are doing their utmost by frequent vomiting and diarrhœa to get rid of the irritants. Repeated stomach and bowel wash-outs are usually harmful at this stage, though an occasional one may be permitted.

(2) The body is suffering from loss of water, so we must supply fluids. Give all the water he wants. The use of a little salt will help the retention of water. From 85 to 125 c.cm. of half-strength normal saline solution per day sweetened with saccharin is used; more than this may cause œdema. Tea, barley water or panopepton water may be used if desired. In severe types subcutaneous injections of salt solution, 85 to 170 c.cm., twice daily may be required. Ringer's solution is valuable and can be obtained in tablet form.

| | |
|---|---|
| Sodium chloride .. .. .. .. .. | 7.5 grammes |
| Potassium chloride .. .. .. .. .. | 0.1 gramme |
| Calcium chloride .. .. .. .. .. | 0.2 gramme |
| Distilled water .. .. .. .. .. .. | 1 litre |

The water should be re-distilled shortly before use. When acidosis is evident *sodii bicarb.* or dextrose (pure) may be added and administered intravenously through the longitudinal sinus. About 3.6 grammes *sodii bicarb.* and 5.4 grammes dextrose may be added to 30 c.cm. Ringer's solution and repeated in 4 to 6 hours, if necessary. Intravenous administration of large quantities of *sodii bicarb.* may cause collapse. Rectal saline injections are best given by the "Murphy drip"; 30 drops per minute for 4 hours are 430 c.cm.. Half strength Ringer's solution may be used. Gum-arabic, 6%, in 0.9% NaCl solution is effective intravenously.

(3) Antipyretics are useful in the form of packs and currents of air from an electric fan.

(4) Stimulation is often indicated; brandy, 0.6 to 0.9 c.cm., every 4 hours; camphor in oil (10%), 0.3 c.cm.; adrenalin, 0.06 to 0.12 c.cm., every 4 hours; caffein, (0.0075 gramme to 0.015 gramme), and strophanthus. Strychnine is of doubtful value. Mustard baths until the skin is reddened.

(5) Complete rest, abundant fresh air and sufficient warmth are essential.

(6) Intestinal medication is relatively unimportant. *Sodii bicarb.*, milk of bismuth and *pulv. cretæ aromat.* may help. Opium has been beneficial occasionally in restraining excessive water loss and securing rest. Irritants, such as mercury or castor oil, in repeated doses are harmful.

(7) Keeping up the same general treatment of the first day, stimulation and abundant fluids, etc., we next offer 10 feedings of about 15 c.cm. each of half and half skimmed milk or albumin milk, to which is added 3% non-fermentable carbo-hydrates in the form of Mellin's food or malt extract, *i.e.*, 3.3%, saccharin being used for the sweetening. Of course if breast milk is available it is the ideal food.

(8) The third day we increase to 10 feedings of 20 c.cm.; casein powder or albulactin may be added to the skimmed milk to increase protein; albumin milk has sufficient.

(9) The following day we may increase to 10 feedings of 30 c.cm., then 40 c.cm. to 45 c.cm..

(10) The diet is kept at 10 feeds of 45 c.cm. without consideration of the stools until the weight curve has straightened out. In no circumstances must the food be changed at this stage. Then the mixture is very carefully increased until the maximum of 90 c.cm. per 500 grammes body weight is reached, gradually grading the carbo-hydrate up to 5%. After a week or two we may return through peptonized foods to ordinary milk mixtures.

In brief the principles are physiological and physical rest and feeding, with high protein, low whey and slowly-fermentable carbo-hydrates. Commence with extremely small amounts and on the evidence of the weight chart gradually increase in quantity, allowing ample water all the time. Another method is to use the curds of skim milk suspended in barley or arrowroot water or 5% gelatine solution. The curds of 45 c.cm. of skimmed milk to each 500 grammes weight are offered in 24 hours, malt sugar being gradually added.

It is hardly necessary to point out, in conclusion, that every baby is a law unto himself in capacity, digestive power and assimilative process. Psychic and material individuality are as characteristic of infancy as of adult life. General guiding principles are essential, but no rigid hard and fast rules can be laid down to fit every case, for the baby is a living entity and not a machine with standardized parts. We must study, examine and handle each baby personally if success is to be attained.

I am unfortunately unable to recollect the names of many authorities to which I should acknowledge my indebtedness, but I wish to express my constant admiration for and appreciation of the teachings of Czerny and Finkelstein and other able exponents in America, particularly Grulee, Gerstley and Hess, of Chicago.

## SOME NOTES ON INFANT MORTALITY.[1]

By **W. F. Litchfield, M.B.,**

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When Dr. Selwyn Harrison offered a paper on the feeding of infants for this meeting, it occurred to me that some remarks on infant mortality might help the discussion. But on looking into the matter, I find that my contribution will have to be in the main a restatement of facts and opinions given by me in former papers before this society or at meetings of the Australasian Medical Congress. The only new matters will be a reference to the report of the Medical Research Committee on the mortalities of birth, infancy and childhood, in which I find a confirmation of some of my views, and some notes on the recent remarkable fall in infantile death-rates in this country and in the British islands.

In giving evidence before the Birth-Rate Commission in 1904 I said the two chief causes of death under one year in New South Wales were congenital defects, including premature births, and gastro-enteritis and that, apart from the fact that gastro-enteritis was more likely to occur in artificially-fed than in breast-fed infants, malfeeding could not be said to be a large factor in causing death in infants. My idea was that, apart from congenital weakness and defects, the chief cause of mortality was infection. In a paper before the Adelaide Medical Congress, 1905, I elaborated my views and showed by means of a chart that, of the 98 deaths per 1,000 births that occurred in Sydney in 1904, thirty were due to congenital disease and defect, forty-eight to diarrhœal diseases, eleven to respiratory diseases and nine to other causes. Next I gave reasons for believing that gastro-enteritis was due to a specific infection, that it was not by any means always conveyed by food and that malfeeding, apart from some definite malady, such as enteritis, syphilis or other infection, was an uncommon cause of death. The relative immunity of breast-fed infants to severe diarrhœa I attributed largely to immunizing bodies in mothers' milk. I shall not repeat my arguments here, but state that they were the outcome of a considerable out-patient experience and close study of statistics.

The report of the Medical Research Committee, referred to above, contains papers by William A. Brend, Leonard Finlay and John Brownlee and is a very valuable one and worthily supports the great work done in the same field by Ballard, Newsholm, Newman and a number of other English medical officers of health.

Dr. Brend's paper is on "The Relative Importance of Pre-natal and Post-natal Conditions as Causes of Infant Mortality." His general conclusions are: "The term 'infant mortality' includes two radically different types of deaths. The first type consists of deaths due to developmental factors, which vary but little from place to place, year to year and class to class and appear to be caused by fundamental influences, which we do not fully understand and at present seem unable to control. The second type consists mainly of deaths due to respiratory diseases and enteritis caused by influences in the post-natal environment most prevalent in crowded, smoky, industrial and mining districts and probably entirely preventible." He shows that in England, Ireland and Scotland in 1914 the difference in the infant mortality in urban and rural districts was very great, being as high as 189 per 1,000 births in Ashton-under-Lyne, the most unfavourable of urban centres, and as low as 38 in Rosscommon (Ireland), the most favourable of the rural districts. He shows also that in all centres and districts the deaths from developmental causes were approximately the same, namely, about 30 per thousand births and that the number of deaths under one month. although there was some overlapping, corresponded with those from congenital causes. With regard to deaths from post-natal causes, he points out that maternal ignorance, poverty, bad housing, improper feeding and bad sanitation are just as common in the country as in the towns and they cannot therefore be the causes of the great difference between the various infant mortalities, although, of course, he does not ignore them.

Dr. Finlay's article is on the causes of infantile

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on October 31, 1919.

mortality. He emphasizes the importance of environment and zymotic diseases as causes of infantile mortality.

Dr. Brownlee's article is on "The Changes in the Physiological Processes of the Developing Child, as shown by its Response to Different Diseases." He uses the statistical method and endeavours to find out the reasons for the liability of infants to their special complaints. His views on feeding are interesting. He says:—

> The difficulty of feeding children, at least after the age of three months, seems to me greatly exaggerated by most writers. The ordinary healthy child will stand and does stand being fed on a most varied diet. To say that a child who is suffering from atrophy, is being badly fed is an incomplete argument. Feeding in itself is, I think, not the chief cause. With regard to many of these cases, my own impression is that the normal developments of the nutritional mechanism have not taken place in due order and therefore temporary difficulties in assimilation have arisen.

Other important facts brought out by Dr. Brend and Dr. Brownlee are that in different places or in different years the difference in mortalities under one year are accompanied by similar differences in the second, third and fourth years. This seems to indicate that the causes operating are independent of difficulties of feeding, since these difficulties hardly exist in the second, third and fourth years.

The fall in infantile mortality that has occurred in this country and England and probably in other countries in recent years is one of the most remarkable and interesting things that vital statistics have to show. At the Adelaide Medical Congress I quoted Professor Budin and the Editor of the *British Medical Journal* as saying that 10% was a fair standard of infant mortality, meaning that this should be the ideal; but the chance of getting below it was remote. Since that time things have so altered that Dr. Brend adopts 5% as the standard by which excess of infant mortality can be measured. In England and Wales the infant mortality declined from 150 per 1,000 births in 1900 to 105 in 1914. In New South Wales the decline has been from 112 for the ten years ending 1900 to 59.2 in 1918. Similar declines have occurred in the other Australian States and New Zealand. A feature of this fall in infant mortality is its universality, every centre and district sharing in it. The following table of districts in New South Wales shows this very well:—

**Infant Mortality, New South Wales District.**

| District. | Ten Years Ending 1903. | 1905 to 1909. | 1918. | Annual Rainfall (inches). | Mean Summer Temp. |
|---|---|---|---|---|---|
| North Coast | 65.3 | 54.8 | 46.7 | 56.7 | 76° |
| South Coast | 75.3 | 64.2 | 52.2 | 38.8 | 68° |
| Monaro | 79.4 | 58.2 | 56.6 | 20-60 | 65° |
| Gundagai | 85.8 | 65.8 | — | 20-30 | 65° |
| Hawkesbury & Nepean | 89.3 | 77.7 | — | 30-50 | 70° |
| Mudgee | 90.5 | 76.3 | 52.4 | 25-30 | 73° |
| Murray | 95.9 | 65.2 | 47.7 | 13-30 | 70° |
| New England | 97.2 | 66.9 | 43.9 | 25-35 | 67° |
| Bathurst | 101.6 | 81.3 | 62.5 | 25-30 | 73° |
| Central Cumberland | 104.2 | 94.2 | 56.3 | 30-40 | 70° |
| The Hunter | 107.9 | 80.8 | 64.0 | 40 | 74° |
| Namoi and Gwydir | 110.9 | 66.0 | 54.1 | 20.4 | 77° |
| Murrumbidgee | 112.5 | 73.5 | 50.3 | 16.2 | 75° |
| Bogan | 110.5 | 82.7 | 64.1 | 18.7 | 73° |
| Argyll | 117.6 | 69.6 | — | 25-30 | 73° |
| Western | 165.0 | 110.3 | 84.8 | 13.2 | 80° |

During recent years there has been some agency in operation that has reduced very considerably infant mortalities. This has been widespread and uniform in its manifestation. Its influence has extended to the second, third and fourth years of life and it has operated by diminishing the number of deaths from infective processes, especially those affecting the bowels and lungs in young children. It has been independent of public health measures and welfare schemes and there has been no great change in the habits of the people during the period of its occurrence. The only thing I can attribute it to is a widespread but obscure climatic effect. If there is a better explanation I would like to hear it.

The death-rate of illegitimate children is two and three-quarter times that of legitimate children. The death-rate of illegitimate children in the first month of life is in this country 50 per thousand births, as against 30 in legitimate children. Thus the increased rate in the mortality of infants born out of wedlock occurs chiefly after the first month. Further, the fall in infant mortality already mentioned has been just as pronounced in the case of illegitimate children as in others.

These few observations on infant mortality show the necessity of distinguishing between ante-natal and post-natal causes of death and the all-important influence of infectious diseases on the latter and that the general environment seems to determine largely the severity of these diseases. To admit so much is not to say that every care should not be bestowed upon young children, but it does help us to see the matter in a right perspective. The most fatal disease to infants in this land is enteritis.

In those children artificially fed, sterilization of the food has not proved effective as a preventive to its occurrence. Breast feeding, though its protection is not absolute, is the surest safeguard against enteric disease in young children.

## THE FOOD FACTOR IN GASTRO-INTESTINAL DISEASES.[1]

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If my paper cuts no ice, I ask your kindly indulgence. My object in bringing this subject before you this evening is not because the keenly scientific members present are not well informed on my subject, but because I recognize there are many members, like myself, who have been bewildered by the gastro-enteric problem and who are looking for any method that offered some criteria upon which to base feeding of these infants.

### Preface.

Within the last couple of decades so many feeding schemes have been devised, with so many amounts, qualities and times of giving of food, as to be most perplexing when subjected to scientific criticism, so that the novice finds it difficult to discover any harmony among the jargon of discordant theories and conflicting practices. Some of the guiding authorities

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on October 31, 1919.

on infant dieteties have laid stress chiefly on the proteins, others such as Finkelstein and Meyer on the carbo-hydrates, others such as Czerny on the fats, while a few have emphasized the mineral constituents of the food and others the water, each pointing to one or other of the food constituents as the one dominant offender. Other specialists in infant feeding have instructed us in caloric food values, percentage feedings, intoxications and infections. Among so much conflicting scientific statement the proper road to travel is often so misty and obscure as to create a formidable difficulty to the "traveller seeking the way out."

### History.

A summary of the steps out of which the present methods of infant feeding have been evolved would commence with the introduction in the middle of last century by Pepper and Meigs of simple cow's milk dilutions with appropriate additions of cream and lactose to make an infant food mixture approximating the ideal human breast secretion. Following these pædiatrists, Rotch, recognizing the inherent differences in cow's milk and human, attributed digestive disturbances to fat, sugar or protein and hoped by a percentage scheme to treat alimentary disturbances by an increase or decrease of the various elements of the food for a nearer approach to the ideal.

Holt and Chapin later introduced home modifications, top milks, cream additions, whole milk and skim milk mixtures. Abraham Jacobi, the veteran pædiatrist, whose recent death we deplore, followed these men by attaching importance to the serious inherent differences between the curd of cow's and human milk, his treatment of this difficulty being cereal decoctions, dextrinized cereals and lime water. Coit sought to remedy the defects in the digestibility of cow's milk by boiling and pasteurization. Finkelstein thought the amount and quality of the food should be determined by the caloric needs of the infant. Meyer in recent years has seen the whole offence in cow's milk feeding comes from the whey, protein and salts. The predominance of views at present is in favour of each child being regarded as an individual dietetic problem to be studied and that no rule is applicable to all.

As with the exception of extremely rare direct bacterial causes all gastro-enteric disease is generally conceded to be due to preliminary perversion of the normal physiological bio-chemistry of the digestive tract, a study of the special physiological peculiarities of the infant organism is helpful to an understanding of the special susceptibilities of babyhood to alimentary disturbances. From very early embryonic existence, the growth of the human frame is accompanied by a gradual condensation of the gelatinous pulp of the primitive embryo to the extreme withered tissue condition which characterizes old age.

An outstanding anatomical feature of early life is the relative abundance of intercellular fluid constantly flushing every tissue of the body. This constant flushing is aided by blood vessels of a relative large size to the heart and body length, the result being a low blood pressure. Such factors, *viz.*, large fluid tissue content and low blood pressure, together with the shorter vascular circuit than in the adult, favour the greater diffusion of nutriment throughout the tissues. In growth the arteries do not increase *pari passu* with body length or heart increase in size, strength and amplitude of contraction, so that as growth proceeds, the blood pressure constantly rises from birth to adult life.

A most obvious physiological characteristic of the baby's alimentary system is that it is in a formative stage and, although immature and unfinished as regards its ultimate destiny, it has to comply with relatively excessive demands not only of waste disposal, but of rapid growth. To this fact, no doubt, is due the known low tolerance of the infant under three months for any food other than human milk, the younger the infant the lower being the food tolerance. Over-estimation of this factor in the infant's economy is not possible, especially as the effect of certain dietary plans may not be evident for days or weeks after they have been entered on.

### Nutritional Requirements.

The nutritional requirements of the baby are met by an adequate protein content in the food for the replacement of tissue destruction and for the rapid growth of the early months of life. Besides this there is essentially required a sufficiency of carbohydrate and of fat for the caloric needs with a due proportion of mineral salts to maintain the chemical balance of the tissues. In addition to the nutritional values of the food the digestibility of the various components of the food must be considered, for the majority of nutritional disturbances are due to indigestion (not non-digestion). That is to say, they are due to the action of food derivatives of faulty digestion and to the absorption into the system of these chemical products from the alimentary canal, with consequent disturbance of general tissue metabolism.

Moreover, the excessive excretion of the chemical products of perverted metabolism from the circulating blood of the mucosa into the intestine and stomach serves further to accentuate the trouble. In an ordinary diet, though the amount of protein ingested should be equal to the physiological requirements of tissue waste, repair and growth, the amount is of less importance than the nature of the protein; that is to say, its nutritive value is proportional to the presence in it of essential amino-acids. Proteins are made up of a score of different amino-acids. Certain of these components, such as lysin, tryptophane and cystein, essential to the human body nutrition, are not present in every kind of protein.

Human milk protein and many animal proteins are rich in these essentials, but cow's milk protein is somewhat defective. This necessitates the earlier use of fruit juices, egg albumin, broth and fresh vegetable extracts, than in the case of the breast-fed child.

Hamburger in 1915 stated that foreign protein is an irritant to the especially sensitive cells of the infant's alimentary tract and the necessity of breaking down that foreign protein molecule throws an extra burden on digestion and, moreover, when foreign protein is introduced into the gastro-intestinal canal there is a similar reaction to active sensitization and immunity as when introduced parenterally. That is to say, sensitization and immunity take place when the foreign protein is introduced into the intestinal

canal. The corollary to this is that some of the symptoms of gastro-enteric disease are anaphylactic phenomena.

Czerny and Keller divide gastro-intestinal disorders ætiologically into two classes:—

(*i.*) *Ex infectione.*

(*ii.*) *Ex alimentatione.*

In the alimentation class no symptom or group of symptoms can be positively attributed to the protein element in the food in the same way as the defect may be attributed to fat, starch or sugar. It is true, casein curds are present in the stools in diarrhœa, but they are not an irritant cause of the looseness. Their presence is only evidence of an abnormal peristalsis unduly hurrying the natural food fragments (to a great extent unchanged) from the small intestine.

*The rôle of the fats.*—In normal digestion 90% of the fat in the food is absorbed, the remainder being discharged in the fæces, the fæcal fat consisting of about 10% of neutral fat, 10% as earthy soaps and remainder at fatty acids. Holt found that with normal digestion the infant stools contain 12% of the ingested fat, while loose stools contained 23% and very loose stools as much at 40% of the intake. Meyer found 50% of the fat in the stools in acute gastro-enteritis to be in the form of fatty acids, very little fatty soap being present; while in chronic intestinal conditions Keller found the soaps greatly predominating. The conclusion to be drawn from these findings is that in alimentary disturbances there is a marked diminution in the fat absorption and that the fat in the stools in the acute conditions is chiefly in the form of fatty acids, while in chronic intestinal disturbances the fæcal fats are chiefly earthy soaps.

In normal digestion the fat-splitting ferment, lipase, of the pancreas and *succus entericus* results in the hydrolization of neutral fats to fatty acids and glycerine. The fatty acids combine with the alkaline carbonates from the intestinal walls to form soaps and probably only in the form of soap is fat absorbed by the epithelium of the villi. In early life the fat-splitting ferments are very deficient, for developmentally it is said to be late in appearance and probably slower in reaching its full efficiency than other ferments. The ability to absorb and metabolize split fats varies greatly with the individual and in the individual at different ages and times. This so-called fat tolerance increases from birth on, but is so low in the early weeks of life that an ideal percentage of other fats approximating that of normal human breast milk precentage cannot even be remotely approached. As fat is so commonly a factor in digestive disturbances, a macroscopic study of the stools is essential. If the unsatisfied fatty acids predominate, irritation of the intestinal wall will cause a protective hypersecretion of mucus and serum and an increased intestinal peristalsis with consequent diarrhœa. The stool will be markedly acid to litmus and large bean-shaped curds of soaped fats, which the increased peristalsis has removed before absorption, will be present with varying quantities of mucus according to the extent of intestinal irritation. The characteristics of such stools will be frequent greasy, offensive motions, smelling of bad butter or cheese and staining with serum a considerable area outside the zone in the napkin containing the more solid soap curds. The soap curds are tough, stain black with osmic acid and, when dried, burn with an odour of burning grease.

In another type of case, more chronic and insidious, the presence of much casein with its calcium salts results in large soapy masses forming. These diminish peristalsis and have a decidedly constipating effect. In these cases the motions consist of hard, dry, granular, cohering masses of calcium soap, often covered with a scanty film of mucus. These stools are alkaline and can be tipped out of the napkin without any fæcal masses adhering. The symptoms of fat disturbances of the diarrhœal type will be those of pain, flatus and of water abstraction from the tissues, while in the case of the constipated type, lessened power of fat absorption from the alimentary canal and systemic disturbance of the acid-alkali balance in the tissues will predominate and there will be a constant ammoniacal reaction in the urine from causes to be later detailed. If high fat percentages in the food be persisted in, serious deprivation of the tissue alkali will follow. An excessive ingestion of fat retards the emptying time of the stomach and delaying hydrochloric acid secretion, retards the reflex opening of the pyloric and closure of cardiac sphincters, so that regurgitation or vomiting is a common natural result.

A constipated alkaline soap stool can be changed into an acid stool by a relative increase in the carbohydrate, a loose acid carbo-hydrate stool into an alkaline by a relative excess of protein, *i.e.*, casein, with the fat. In other words, fatty acids or soaps predominate according to the reaction of the stool and they in turn depend on the relation of the components of the food to each other. Fat absorption in babies with soap stools is considerably less than that of normal infants, but there is not so great a loss of fat as in fat diarrhœa.

It is now many years since Czerny attributed most digestive disturbances to the fat of the food, but judging by the high cream percentage of many milk formulæ and the high fat percentage of the most popular dried milks in use, his views have been frequently overlooked. A most striking fact at the present time is the large number of infants coming to hospital clinics whose trouble has started in the use of high cream percentage milk powders. It must be remembered that the fat of human milk is different to the fat of cow's milk and in the construction of feeding formulæ the ideal fat percentage of human milk cannot be substituted by a like percentage of cow fat without an extra tax on the fat tolerance of the baby. Fat intolerance is a condition of fairly easy causation as the result of climatic conditions of heat and moisture, such as prevail in a Sydney summer season. The onset of the hot and muggy days here is soon followed by epidemics of gastro-enteric disturbances, often wrongly attributed to bacilliary infection, when disturbances of fat metabolism are the real cause.

In infantile dyspepsias, though there exists in some quarters a tendency to assign to the fats the dominant rôle of almost all grades of indigestion, there is an almost unanimous concensus of opinion that

disturbance of the metabolism of the sugars aggravated by abnormal digestion of the fats is the chief, if not the only, bio-chemical digestive anomaly, while primary protein disturbance, if it does occur, is decidedly rare.

Sugars in the infant tissues seem to play the same rôle as inorganic salts by favouring water retention, with which it is probably loosely combined and held in the subcutaneous tissue. In the normal digestion of the small intestine the disaccharids, such as cane sugar (sucrose), are changed into the monosaccharids dextrose and lævulose, lactose into dextrose and galactose, while the more elaborate chemical molecule of the starch is successively hydrolized into maltose and dextrin and finally into dextrose. Carbo-hydrates, escaping absorption as dextrose, are liable to fermentation by the agency of the normal saphrophytic flora of the intestine, producing acetic, lactic, butyric and succinic acid, carbon dioxide, alcohol, methane and hydrogen. When the proportion of carbo-hydrate in the food is relatively excessive and the acid-forming bacteria of the intestine, such as *Bacillus bifidus communis,* predominate, the stools are acid, smell like vinegar, are passed with much flatus and evident pain, while the soreness and excoriation of the circum-anal skin often shows the acrid irritant character of the fæcal discharge. Such stools contain curds of undigested fatty soaps and of unchanged protein hurried along by the reflexly stimulated intestinal peristalsis. The same cause, *viz.,* the extra acid reaction in the bowel, determines an increased secretion of protective mucus, as seen in the stools. A serous discharge also from the blood vessels into the alimentary canal is shown in the fluidity of motions. In acute intestinal disturbances the sugars are necessarily more commonly at fault than the less easily fermented starches, while of the sugars, lactose is far and away the most disturbing of them all. Normally the acids in the intestinal wall are neutralized by the bicarbonate of soda from the blood plasma, by the acid or alkali phosphates of the cells or by the calcium of the protein (calcium paracaseinate). Acids formed in the body or introduced from the outside displace the soda bicarbonate, setting free carbon dioxide, excess of which is removed by pulmonary ventilation, leaving the neutral salts for removal by way of the kidneys. In addition to this method of acid removal, the kidneys have the power of secreting an acid urine from a nearly neutral blood. A third method of removal is by the cleavage of the protein molecule, increasing ammonia production for attachment of the acid, which is thus prevented from passing over as urea ammonia. In other words, ammonia is used as an alkaline reserve of the body.

A destruction of the acid-alkali equilibrium or, in more modern phraseology, a disturbance of the hydrogen ion content of the body, is seen in the marked tendency in gastro-enteric disturbances to acidosis and the increasing amounts of ammonia in the urine.

Excessive ingestion of carbo-hydrates, such as is always present in condensed-milk feeding, is always open to the danger of this disturbance of the chemical balance of the body.

Preliminary to the consideration of digestive disturbances *ex infectione,* a résumé of the physiological factors rendering the infant more susceptible to microbic infections and their resulting toxins than the adult, will not be considered inappropriate. The undeveloped condition of the skin and mucous membranes, together with the fragility of the blood vessels in infancy, lessens the resistance of the body's first line of defence, while the permeability of the lymph channels and the immature bacteria-arresting power of the lymph nodes lowers the second defence barrier. Moreover, the immunity defence which the adult has acquired by successive inoculations of various organisms is limited in early life to such antibodies as have been acquired through the mother's milk. Artificially-fed babies are deprived of even this maternal-transmitted immunity, while their body mechanisms are so taxed by the assimilation of foreign protein of the food as to be less able to elaborate protective substances against possible protein of microbic infections. In children suffering from dyspepsia, the relative weakness of these microbic and toxin defence barriers is still further marked, so that the penetration of the intestinal mucosa by organisms and the the toxic products of incomplete protein digestion is made more possible. The consequence of this passage into the blood is a sudden acute illness, with collapse, high fever, diarrhœa, hurried breathing, leucocytosis, all symptoms embodied in the term intoxication. In every child preparatory to the passage of the intestinal barriers of what is frequently the normal flora (perhaps with exalted virulence) of the intestinal tract, there is an antecedent period of more or less nutritional disorder. Such disturbance prepares the ground for the systemic poisoning of the child by noxious chemical agents, derived from the food or from bacteria, before or after ingestion into the alimentary canal. The incidence of infectious cases in hot, humid weather is favoured by the resulting lowered systemic resistance, coupled with the liability of food infection before administration.

The active initial causes of these intoxications are usually the disturbances of tissue metabolism by lowered tolerance for some special food component brought about by chemical or microbic agencies before or after ingestion and cases are very rarely due to direct infections *per se* of bacilli of the Shiga or Flexner class.

Though in rare epidemics the primary cause may be the bacilli of Shiga, Flexner or of His or the gas bacilli of Welch, the usual and commonest cause is the abnormal activity of the normal denizens of the intestinal tract as the colon bacillus, *Bacillus bifidus communis, Proteus vulgaris,* strepto- and staphylococci, which availing themselves of a Lamarkian exaltation of virulence with preliminary lowered defence from metabolic digestive disturbances, have been able to overcome the common barriers which prevent the entry of these organisms or their toxins into the blood.

#### Inflammation, Enteritis.

Up to this time we have dealt with conditions which show scanty or no evidence of pathological changes in the intestinal mucosa. The irritation of the epithelial lining of the canal may cause changes more

evident to the eye than the functional derangements of secretory and excretory activity and, as the result of inflammatory reactions of all grades and types in any part of the stomach and intestine, gross pathological changes may ensue. The consequence of these inflammations may vary from temporary hyperæmias to permanent destruction of extensive areas of the intestinal mucosa. All such conditions are embraced in the loose term gastro-enteritis.

#### Marasmus.

Following on all intestinal conditions (*a*) from a disturbance of the selective absorption or secretion of the alimentary epithelium, (*b*) from destruction of the mucosa in any part or (*c*) from demineralization and (*d*) from tissue dehydration, altering the hydrogen ion or protein concentration of the blood, the digestive mechanism may be so disturbed that a condition of marasmus may ensue. In these cases the tolerance for any or all the essential constituents of the food may be so markedly lowered that alimentation so far fails to meet vital requirements of the body that gradual progressive death from inanition supervenes, "the ending of a tale," the opening of which was an indigestion, next a fermentation, then an intoxication, an inflammation, one or all contributing to a condition of food atrophy, athrefisia, also variously called decomposition or marasmus.

#### Treatment.

From the foregoing it will be concluded that the scientific bases of treatment in all these aforementioned conditions are:—

First, to empty the stomach and intestine of all offending material by stomach lavage, colon lavage, emetics and purgation;

Second, to aim at complete physiological rest of the body in bed and of the intestinal canal by abstension from the offending component or preferably from all food for periods of twelve to forty-eight hours, according to the gravity of the condition;

Third, to combat the effects of loss of tissue turgor, to make good the dehydration of the drained body tissues and favour the elimination of toxins by the copious administration of normal saline solution, or carbonate of soda drinks, by prolonged drop "salines" into the bowel, or by hypodermoclysis by intra-peritoneal or direct transfusion of saline, alkaline or sometimes glucose solutions into the superior longitudinal sinus;

Fourth, to counteract by carbonate of soda transfusion marked acidosis;

Fifth, to allay by emolients, such as paraffin emulsion or bismuth in massive doses, the associated inflammation;

Sixth, by the later use of astringents, such as silver nitrate or zinc oxide, to relieve persisting catarrhal diarrhœas;

Seventh, by sedatives or stimulants, as the case may require, to treat the remote nervous consequences of the toxæmia.

Apart from these general indications for therapeusis, the absorbing problem in every case of alimentary disturbance is the associated lowered tolerance for one or all food components. The food treatment lies between the scylla and charybdis of maintaining nutrition and keeping well within the limits of lowered food tolerance. In dyspepsia, the tolerance for fat is the first and most markedly affected, next the sugars, then the starches and finally the protein. By temporary discontinuance of the various food factors, the return of tolerance is in the reverse order, recovery of protein tolerance being quickly effected, then more slowly that of the starches and sugars, while the fat tolerance is far and away the last and slowest to return, indeed, in very many cases the former fat tolerance once lost, can never again be achieved. If there is a failure of tolerance for all food constituents, absolute abstinence from all food ingestion will in a few hours (twelve to forty-eight) result in some recovery, first for the casein protein and then for the lact-albumin tolerance. The physiological indications for the first feedings in this case would be some such casein food mixture as that of von Pirquet's clinic. This mixture is made from the washed rennet curd of two and a quarter litres of separated milk, mixed with a 5% of aqueous solution of bicarbonate of soda, until the reaction to litmus is amphoteric or slightly alkaline; water is then added until the bulk of the mixture is one litre and the whole boiled until the curd goes into solution. When the evidence of the stools points to return of protein tolerance, carbohydrates should be gradually introduced into the mixture by simple additions of boiled skim milk to the casein mixture. The casein content of the mixture should then gradually be decreased and the proportions of separated milk increased until the feeding consists wholly of separated milk and water.

When tolerance for this mixture is reached, carbohydrate in the form of malt extract (a mixture of dextrin and maltose) should be gradually added and later, perhaps, cane sugar. The tolerance for fats is next exploited by the gradual replacement by whole milk of separated milk or by the addition of increasing percentages of cream, but care is taken not to attempt with cow fat the percentages normally present in the human breast. The preparation of these mixtures may be considerably facilitated in the home treatment by mixtures of commercial skim milk powder, "Trufood" and one of the full cream milk powders, *e.g.*, Glaxo or Lactogen. It has been experimentally proved in these cases that caloric values of the food offered should never exceed 80 to 100 calories to the kilogram weight of the baby *per diem*.

In gastro-enteric cases of lesser severity, stool examination may disclose only one food ingredient at fault, in which case the temporary removal of that offending ingredient, whether it be fat or fat and carbo-hydrate, will in itself be sufficient. A practically sugar-free, fat-free diet, like broths or egg albumin, will in most cases temporarily tide the patient over the resting stage, which is to insure a return of tolerance for carbo-hydrates. In the treatment of infantile dyspepsias the individual idiosyncrasies of the patient are so marked that a simple

diet routine applicable to all cases is not possible. For the general help of resident medical officers and nurses I have compiled the appended scheme which, by past use in private and hospital treatment, I have found saves time and is also valuable as an indication to interested co-operators in treatment, of the scope of my aims. Hardly any case needs to be subjected to the whole gamut of food modifications. In treatment many cases are commenced a few rungs from the bottom of the ladder and in practice many steps can be skipped in the face of rapid improvement in stools and in the patient's general condition. In the scheme I have attempted to embody the ideas that the fat is the prime offender, next the carbo-hydrates and, lastly, the proteins and that tolerance for the individual food ingredients returns in the reverse order. The meddlesome interference with the intestinal flora by a bactericidal attack by intestinal antiseptics I regard as useless, if not harmful.

**General Feeding Scheme—Gastro-Enteritis.**

After Admission.

| | |
|---|---|
| (1) 6-12 hours | Water and bicarbonate of soda, 10 grammes to litre, or water sweetened with saccharin. |
| (2) 12-24 hours | Cereal waters sweetened with saccharin. |
| (3) 24 hours | Mutton broth, standard protein (2%), egg albumin water, standard protein (1%). |
| (4) 24-48 hours | Milk casein and water, standard, sweetened with saccharin. |
| (5) 24 hours | Boiled separated milk and water, equal parts sweetened with saccharin (value, 17.8 calories to 100 grammes). |
| (6) 24 hours | Boiled separated milk, three parts; boiled whole milk, one part; water, four parts; sweetened with saccharin (value, 23.2 calories to 100 grammes). |
| (7) 24 hours | Boiled separated milk, two parts; boiled whole milk, two parts; water, four parts; sweetened with saccharin (value, 27 calories to 100 grammes). |
| (8) 24 hours | Boiled separated milk, one part; boiled whole milk, three parts; water, four parts; sweetened with saccharin (value, 30 calories to 100 grammes). |
| (9) 24 hours | Boiled whole milk and water, equal parts, sweetened with saccharin (value, 35.6 calories to 100 grammes). |
| (10) 24 hours | To above add one half-teaspoonful of extract of malt to each feed (value, 35.6 calories to 100 grammes, plus 45 calories per day). |
| (11) 24 hours | Increase extract of malt to one teaspoonful to each feed (value, 35.6 calories per 100 grammes, plus 90 calories per day). |
| (12) 24 hours | Boiled milk and water, equal parts; one teaspoonful of extract of malt; one teaspoonful of flour ball (value, 35.6 calories per 100 grammes, plus 125 calories per day). |
| (13) 24 hours | The same as above, plus two teaspoonfuls flour ball (value, 35.6 calories per day, plus 158 calories per day). |

If malt extract is too laxative, add 0.18 gramme of *pot. bicarb.* to each bottle or substitute cane sugar for extract of malt.

**Standards.**

1 ounce of flour = 4 level tablespoonfuls = 100 calories.
1 ounce of sugar = 2 level tablespoonfuls = 120 calories.
1 ounce extract of malt = 2 scant tablespoonfuls = 90 calories.

*Albumin Water.*

White of one egg in eight (8) ounces = protein 1%

*Mutton Broth.*

One lb. of finely-chopped, lean mutton in pint of cold water with pinch of salt. Soak for two hours and then cook for three hours over a slow fire. Add water, if necessary, to half a pint. Protein 2%, extractives 2%.

*Cereal Water.*

Two heaped teaspoonfuls of rice or barley soaked for 3 hours in a pint of water and then allowed to simmer to half a pint.

Value: protein 0.09, fat 0.05, starch 1.65.

No condensed milk or milk powders to be given except under instructions. Peptonization, whey, proteid and patent foods when ordered.

Feeding as far as circumstances permit to be three hourly and, if possible, at night a six hour interval, *i.e.*, six feeds in 24 hours, *i.e.*, 6 a.m., 9 a.m., noon, 3 p.m., 6 p.m., 9 p.m.

## Reviews.

### A FAMOUS MORPHOLOGIST.

The record of the life of Sir William Turner presented by his son, Dr. Logan Turner, as "a chapter in medical history" is a notable addition to the biographical literature of British medical science.[1] Turner's scientific activities extended through the long period of over sixty years. And it is not too much to say that no other period of sixty years in the history of natural science has been so prolific in discovery and constructive hypothesis. Turner's own contributions to the movement in the domain of human and comparative anatomy were numerous and weighty. His intercourse with a wide circle of his distinguished scientific contemporaries was intimate and extensive, whilst his influence on a long succession of pupils and disciples was formative and inspiring.

Nor does his title to academic distinction rest only upon his considerable achievements in the science of animal morphology. There it was, indeed, that he won his spurs at an unusually early age. And there, also, he continued to reap a fruitful harvest to the very close of an exceptionally active and industrious career. But these activities represent only one side of Turner's life work.

For well over fifty years his influence was a force to be reckoned with in the academic world and more especially in matters concerning medical education. This phase of his work naturally manifested itself first in Edinburgh, but ere long he became a recognized authority throughout the United Kingdom. During his long tenure of office on the General Council of Medical Education and Registration of the United Kingdom he established a practical supremacy in this highly important sphere.

The final period of an exceptionally busy life was spent as Principal and Vice-Chancellor of the University of Edinburgh. In this high office his rare gifts for organization and academic government were utilized to the fullest in the interests of the advancement of learning generally, as well as in the development of that great Scottish institution with which this notable Englishman had so whole-heartedly identified himself. Although in many respects he remained a typical Englishman, he was intensely loyal to the Scottish University over which he had come to preside—jealous of her reputation and proud of her renown. Nor was this any mere subtle egotism. He was genuinely convinced of the value of the Edinburgh plan in the training of the student of medicine. As his biographer informs us, "he was sometimes twitted at having become more Scottish than the Scot," an impeachment which he was never greatly concerned to resent.

It is a little difficult to estimate the value of Turner's contributions to morphological science. His industry was untiring and the collective output of his long-continued labours was prodigious. As an accurate observer he was unexcelled. His very real supremacy as a scientfic anatomist was due rather to his entire faithfulness to facts than to

[1] Sir William Turner, K.C.B., F.R.S., Professor of Anatomy, and Principal and Vice-Chancellor of the University of Edinburgh: A Chapter in Medical History, by A. Logan Turner, M.D.; 1919. Edinburgh and London: William Blackwood & Sons; Sydney: Angus & Robertson, Limited; Demy 8vo., pp. 514, illustrated. Price, 21s.

any marked brilliancy of treatment. The illumination that he brought to bear on observed facts was clear and steady rather than dazzling. He was, indeed, deeply distrustful of attractive hypotheses. His own presentation of extensive series of facts and observations was invariably so simple and unassuming that the masterly handling and marshalling of the data might easily escape the notice of the casual reader. His work in several important directions was creative, notably that on the comparative anatomy of the brain and on physical anthropology. But his scientific activity in general is admirably summed up in the dictum of Professor Arthur Keith: "On the thread of his life are strung all the beads of British anatomy for half a century and more."

Altogether apart from a special interest in Turner's contributions to knowledge or in his successes as a master of academic organization, this biography provides a most engrossing study of the life history of a remarkable man. It is a striking picture of the natural and inevitable development of the career which owed little or nothing to advantageous family circumstances, social position or favourable environment. In this picture we see a youth of native talent and ability pursuing his studies in letters and in the rudiments of medical science with conscientious thoroughness. We see the steady growth of a genuine interest in and devotion to natural science and we see the pursuit carried on with unflagging zeal and industry, with sincere and honest purpose and with healthy and legitimate ambition. We see the unexpected and even somewhat disconcerting opportunity come to him at an unusually early period of his development, an opportunity which a weaker man might have timidly refused, or might have bungled through incompetence or immaturity. We see the opportunity seized and exploited to its fullest value and the subject of it going on from strength to strength to the climax of a truly great career.

## OSTEOMYELITIS.

There are few subjects that have come prominently into the forefront of surgery as a result of the war, of more insistent urgency than that treated in a volume entitled "Chronic Traumatic Osteomyelitis, Its Pathology and Treatment," by Dr. J. Renfrew White, Orthopædic Surgeon to the New Zealand Forces.[1] The publication bears the date 1919, which means that further editions of this work will be enriched by more extended experience and later reports of cases than is possible in the present volume; for chronic osteomyelitis will be the most persistent of all the remediable troubles from which the wounded man is prone to suffer. Those surgeons who have been much occupied with late military surgery, will probably be inclined to hurry through the earlier chapters of this volume, which treat of the physiology and pathology of bone. Nevertheless, there is much that will repay careful perusal in this more theoretical section of Dr. White's writings. But it is the question as to the best mode of treatment for this most disheartening disease that claims chief attention and here we obtain real help of a very practical kind. Dr. White is the apostle of what he calls the radical operation and in this case the word radical might just as well be "efficient" as distinguished from inefficient. The ordinary operation of merely opening up the cavity and removing the sequestrum has proved to be more completely inefficient in the conditions that prevail among the soldiers, than it had proved to be in necrosis and osteomyelitis, the result of infection alone. In the case of chronic osteomyelitis supervening upon smashed and comminuted fractures, this which we may call the ordinary or old method is quite useless. The radical method of Dr. White involves a different point of view. It can be indicated by the analogy of burrowing fistulæ in the soft parts. Just as these are freely laid open from end to end, so the tunnelled and excavated bone must be laid open. In a word, the affected bone with its cavities and branching tracks should be so completely opened up that it is converted into the nearest possible approach to a plane surface. This always involves a liberal incision and Dr. White lays great stress on "no sutures." We can cordially endorse every word of the above and, for it alone, Dr. White's book should be in the hands of all surgeons to military hospitals. The actual details of cases give the impression of scantiness and incompleteness, but this in the nature of things is quite unavoidable and will be rectified without doubt in a later edition. While Dr. White's principles are not difficult to carry out in the case of the middle of the shaft of a long bone, such as the femur, we have not derived the same help from his writings in the case of large cavities in either end of the tibia impinging closely upon the knee or ankle joints. With these difficult cases helpful suggestions will be looked for from Dr. White in the near future.

[1] Chronic Traumatic Osteomyelitis: Its Pathology and Treatment, by J. Renfrew White, M.B., F.R.C.S.; 1919. London: H. K. Lewis & Company, Limited; Demy 8vo., pp. 144, with 24 plates and 13 diagrams. Price, 12s. 6d.

## GIRL AND BOY WELFARE CONFERENCE.

His Excellency the Governor of Western Australia opened a Girl and Boy Welfare Conference of religious, educational, social and municipal bodies at the Town Hall in Perth on November 11, 1919. The Conference has been organized by the Child Welfare Bureau of Western Australia. Its objects were to consider the necessity of studying the best methods of awakening and training the capacities of the child and to create a deeper interest in the vital question of child welfare. The Conference lasted for four days and was largely attended. The subjects dealt with included "The Influence of the University on the Young Life of the State," introduced by the Chancellor of the University, His Grace Archbishop Riley; "Practical Teaching of Sex Hygiene," introduced by Professor Dakin; "Modern Methods of Training the Socially Inefficient," introduced by Miss Stoneman; "A Modern Children's Court," introduced by Mr. Albany Bell; "Playgrounds and Open Spaces in the City," introduced by Mr. W. Saw; "The Child and the New Age," introduced by Miss Priest; "The Girl and Boy in the Labour Market," introduced by the Honourable J. E. Dodd; "Brain, as the Physical Organ of Mind," and "Brain Growth, Mental Development and Education," introduced by Professor R. J. A. Berry; "School Children and Street Trading," introduced by Mr. Cecil Andrews, the Director of Education; and, lastly, Social Derelicts and National Efficiency," introduced by Professor Berry.

The Conference adjourned from November 17 to November 24, 1919, in order to enable Dr. Truby King to take part in the general discussions on infant welfare. All these highly interesting and important subjects were discussed gravely and fearlessly. The speakers did not endeavour to minimize the difficulties that have to be overcome. Each practical problem was discussed on the basis of experience and exhaustive study. We feel convinced that this conference will be productive of real advance in the children's problems in Western Australia.

## MEDICAL OFFICERS' RELIEF FUND (FEDERAL).

The Trustees acknowledge, with thanks, the receipt of the following donations to the Medical Officers' Relief Fund:

(NINTH LIST.)

**South Australia.**

| | £ | s. | d. |
|---|---|---|---|
| Sir Joseph Verco .. .. .. .. .. .. | 150 | 0 | 0 |
| Dr. Violet M. Plummer .. .. .. .. | 50 | 0 | 0 |
| Dr. H. Bowen James .. .. .. .. .. | 10 | 10 | 0 |
| Dr. H. M. J. Halloran .. .. .. .. .. | 5 | 0 | 0 |

**New South Wales.**

| | | | |
|---|---|---|---|
| Dr. Joseph Marshall .. .. .. .. .. | 5 | 5 | 0 |

Total to December 2, 1919, £9,775 16s. 7d..

We have been informed that Dr. Henry Jellett proposes to start in practice in Christchurch, New Zealand, as a gynæcologist and consulting obstetrician. His term of office as Master of the Rotunda Hospital, Dublin, ended in November, 1919. He will leave Ireland during the present month.

The Medical Journal of Australia.

SATURDAY, DECEMBER 6, 1919.

## Footing the Bill.

In the present issue we publish the ninth list of contributions to the Medical Officers' Relief Fund. The Trustees asked for £50,000. The Fund stands now at £9,775, approximately one-fifth of the amount required. There are about 3,000 members of the British Medical Association in Australia. The appeal has been made to those who have not served with the forces abroad. Their number may be taken as 2,000. Up to the present 296 members of the medical profession have contributed and several of them are returned men. This means that there are still at least 1,700 members who have not yet sent in their subscriptions. Many of these men, no doubt, had good and sufficient reasons why they did not enlist for active service in the Army Medical Corps or in the Royal Australian Naval Medical Service while the Empire was at war. Is it possible that any of them would claim a good and sufficient reason for not contributing to this Fund? The physical disability that rendered them ineligible for active service, cannot prevent them from writing a cheque. Domestic obligations have been put forward as reasons for not enlisting. There are no home ties that are incompatible with giving to a good cause. Professional duties cannot make it impossible for a man to put his hand into his pocket. The only excuse that has yet been put forward is that no statement has been issued concerning the number of incapacitated returned medical officers, of dependants of those who have fallen, and of the returned men who need financial aid to start their professional life anew. This excuse is not valid and the absence of the information at the present stage should not deter men from contributing. The number of men who have received bodily injury either from wounds or from illness during active service, is probably small. We trust that no further instances will come to light in addition to those already known. It requires careful inquiry and discrete searching to ascertain whether some of these men are in need of assistance from the Fund. In a few instances there is no doubt whatever that special means will have to be found to enable these men to earn a reasonable living. The local committees appointed for the purpose are being approached in regard to some of them. It must, however, be remembered that a very large fund would be required to place a dozen severely handicapped men in a secure financial position. In a similar manner it is a delicate matter to investigate the pecuniary position of the widow and orphans of our dead colleagues. A few cases are known of actual need. Other instances will probably be revealed of straitened means which will make it difficult or impossible for the children to be educated as the children of medical practitioners should be educated. Even if these instances are few, a considerable sum of money will be required for the purpose. In the last place, the fact that the Department of Repatriation definitely refuses to admit the claim of a returned medical officer for a loan to purchase commodities other than surgical instruments, opens up a wide field of usefulness for the fund. Some of our colleagues require money temporarily to enable them to settle in practice. Assistance in the purchase of a practice or of a car, loans to remove temporary financial embarrassment due to prolonged service abroad and means to permit a medical practitioner to temporarize who feels the need for a course of post-graduate study before entering medical practice, must be provided for a relatively large number. We have learned that this assistance is not forthcoming from the Commonwealth Government. It will thus be seen that £50,000 is not too large a sum to hold in readiness for the assistance of our returned colleagues and for the dependants of the dead. We appeal very earnestly to all who have delayed, to give at least £20. It is little, very little, for a prosperous medical practitioner. Even for a man with a small practice and with limited means, this sum can be spared by a small personal abnegation. Those who have profited by the absence of their colleagues, should allow their conscience to dictate the extent of their contribution. Time is passing and the fund is still far from full. The tenth list should be a record one with the solemn season of Christmas rapidly approaching.

## THE FEEDING OF INFANTS.

In the present issue we publish three interesting articles dealing with the nature of an acute infective process which kills more babies than all other pathological conditions aggregated in one group. It is usual to call this condition gastro-enteritis, although exception can be taken to the term. Two of the speakers sought to establish a pathology depending primarily on a bio-chemical disturbance of the metabolic mechanism. They relegated the theory of infection to a position of secondary importance. The third speaker essayed to prove that the affection is primarily an infective process and that the disturbances of digestion and metabolism are effects of this cause. While it cannot be denied that the condition is associated with an infection, at all events in the majority of cases, it is remarkable that the form of infection is variable. The infants under the influence of this condition undoubtedly react abnormally to foods. This change is constant and highly complex. It is by no means easy to determine the nature of the chemical disturbance, nor has it hitherto been possible to ascertain whether the symptoms are produced by a definite group of dissociation products of the ingested foods. It has been shown that infants fed at the breasts of healthy mothers are affected much less frequently than infants artificially fed. Indeed, it would seem as if breast feeding by healthy women were a safe prophylactic against this dangerous condition. Moreover, the majority of clinicians who have studied the diseases of infants, rely on dietetic treatment rather than any specific drug or preparation.

The problem of the feeding of infants is an extremely difficult one. Our knowledge of the reaction of infantile tissues to the products of the proteins, carbohydrates, fats and inorganic salts is limited. Nature has adjusted the milk of the mother exactly to the requirements of the baby. The milk of any of the lower animals is undoubtedly inferior to human milk for the purpose of feeding either a healthy infant or an infant whose tissues are physiologically abnormal. It is not unreasonable to suppose that in an early stage of development the fœtus has not power of dissociating proteins, carbo-hydrates or fats. It is known that there is a biological response on the part of a living organism to a foreign protein. This response manifests itself by the appearance of an enzymic action directed toward the special protein introduced. It is quite possible that the repeated ingestion of proteins, carbo-hydrates and fats of a specially suitable kind calls forth in the infant's organism a biological response in the form of those digestive ferments that persist throughout life. At first the proteolytic ferments would be relatively weak and highly specific. They would act only on the proteins of mother's milk. Similarly the power to convert starch into sugar would be called into existence by gradual stages. The saponification of fats would be accomplished at a relatively early stage, since this process appears to be less complex than the others. If these assumptions, which are based on observed biological phenomena, be correct, it would be easy to understand why cow's milk, altered to approximate human milk in chemical composition, fails to yield satisfactory results in very young infants.

Experience teaches us that as the baby grows older, the power to deal efficiently with heterogeneous proteins and carbo-hydrates increases in proportion to the ingestion ofthese foodstuffs. There is much to be learned concerning the reaction of the infantile organism to homogeneous and heterogeneous proteins and carbo-hydrates and the possibility of training the tissues to produce the necessary ferments in increasing extent. This subject should be studied closely by those who devote their attention exclusively to infants. The metabolism of healthy infants fed in varying ways should be investigated in order that the limits of the capabilities of the infant's organism in regard to the digestion and utilization of different forms of food can be accurately ascertained. The practical lessons to be drawn from the consideration of this problem are that baby clinics should always be under the direction of specially trained experts and that the fashionable method of handing over the healthy babies to the nurse, leaving the abnormal baby to be looked after by a medical practitioner, should be swept away. In the second place every specialist in the care of infants must equip himself as a bio-chemist and must be prepared to carry out chemical investigations of a complex character. The third deduction is that the milk supply should be regulated strictly. It should be

possible to procure at a reasonable cost milk that is reliable both in regard to its quality and in regard to its bacterial content. The crime of selling adulterated, dirty or spoiled milk should be punished very severely. The man who sells of this kind of milk is morally guilty of manslaughter.

## SCURVY ON SHIPS.

The narrative of the voyages of Captain James Cook round the world contains some references to the occurrence of scurvy and its treatment. Impressed by the disasters of his first voyage Cook took such precautions in his second and third voyages as to show that scurvy could be controlled by suitable measures. In the first voyage Cook proceeded in the *Endeavour* from Deptford yard upon the Thames on July 30, 1768. He sailed to Otaheite, which he reached in May, 1769. From that island he made his celebrated observations upon the transit of Venus. On leaving these hospitable shores he took with him a native, Tupia, and his son. Thence he sailed to New Zealand, where he spent six months exploring its coasts. On April 11, 1770, he sighted this continent and sailed northwards along its eastern shore. Three months later the *Endeavour* ran upon a reef lying within the Great Barrier. On June 14, Cook refers for the first time to the presence of scurvy on his ship. "At this time scurvy with many formidable symptoms, began to make its appearance among our navigators. Tupia, in particular, was so grievously affected with the disease that all remedies prescribed by the surgeon could not retard the progress. Mr. Green, the astronomer, was also on the decline. These and other circumstances embittered the delay which prevented our commander and his companions from getting on shore." On the evening of Xmas Day, at Batavia, Cook notes that: "The sick persons in the ship amounted to 40, and that the rest of the company were in a feeble condition. It was remarkable that every individual had been ill excepting the sailmaker, who was an old man between 70 and 80 years old." Tupia and his son died. In respect to their sickness Cook notes that they soon contracted the disorders which are incident to a sea life as they had been accustomed to subsist from birth on vegetable food and particularly on ripe fruit. During the voyage home from Batavia, three and twenty persons died in addition to seven who succumbed in Java. These calamitous events made a powerful impression on the mind of James Cook and gave occasion to his thoughts concerning the methods of preserving the health of seamen which he pursued afterwards with success.

Within a few months of his return from his adventurous voyage Captain Cook was directed by the Lords of the Admiralty to search for a southern continent. He had already shown that neither New Zealand nor Australia were parts of that *Terra Australis Incognita* which had excited the imagination for two centuries. For this enterprise he was given charge of two vessels, the *Resolution* and the *Adventure*. Among their provisions was "an ample supply of anti-scorbutic articles, such as malt, sour krout, salted cabbage, portable broth, saloop, mustard, marmalade of carrots and inspissated juice of wort and beer." Captain Cook set sail from Plymouth Sound on July 13, 1772. As he proceeded to the southward he made three puncheons of beer of the inspissated juice of malt, and the liquor produced was very brisk and drinkable." By December 25, some of the crew showed signs of scurvy and were treated each day with a draught of fresh wort made from malt. In March, 1773, Cook reached Dusky Bay, New Zealand, after cruising for some weeks in the Antarctic regions. "So salutary were the effects of sweet wort and several articles of provisions, and of the frequent airing and sweetening of the ship, that there was only one man on board afflicted with scurvy." From the leaves of a tree resembling the American black spruce beer was made with molasses and inspissated juice of malt. This beer was used to supply the want of vegetables. The event showed that the judgement of Cook in this matter was not mistaken. At Queen Charlotte's Sound Cook went on the morning after arrival to look for scurvy-grass, celery and other vegetables. He obtained a boat load in a short time. Orders were given to boil these vegetables with wheat and portable broth for breakfast and with peas and broth for dinner. These vegetables were found very beneficial in removing various scorbutic complaints from the crew of the *Adventure*. This vessel parted from the *Resolution* in a gale near the Cape of Good Hope, but reached the *rendez vous* arranged in Queen Charlotte's Sound after exploring much of the coast line of Tasmania. Some of the crew refused to eat the mash of vegetables with wheat and peas, but the steady and persevering example and authority of the commander gradually overcame the objections. As the beneficial results of the use of these vegetables and of the beer became evident, the seamen were only too ready to seek for vegetables when they reached a place in which they were scarce. In November, 1773, the *Resolution* came again into Queen Charlotte's Sound after much travel through the Pacific regions. "Everywhere they found plenty of scurvy-grass and celery. These Captain Cook ordered to be dressed every day for all the hands. By the attention he paid to his men in the article of provisions, they lived for three months on a fresh diet and at this time there was not a sick or scorbutic person on board." In April, 1774, the diary of Captain Cook shows that scurvy had not appeared, although the ship had been at sea for nineteen weeks, and the men had lived on a salt diet supplemented when needed by anti-scorbutic vegetables. In July, 1775, the *Resolution* returned to England with the loss of only one man from sickness.

A year later Cook started on his third voyage to the Pacific waters in the *Resolution*, which was accompanied by the *Discovery*. In February, 1777 he was once more at anchor on his old station at Queen Charlotte's Sound. Every day fish were caught and used to provide fresh food. "Nor was there any deficiency of vegetable refreshments, to which was united spruce beer for drink so that if the seeds of scurvy had been contracted by any of the crew, they would speedily have been removed by such a regimen."

The fact, however, was, that there were only two invalids upon the sick lists of the two ships. On April 28, the diary of the great navigator records that there had not been as yet a single sick person on board, although the only refreshment had been in New Zealand. This happy situation was attributed to the attention paid to the diet and to the use of wort as occasion demanded. This is the last entry referring to scurvy in the narrative. Although Cook seems unaware of the fact, the yeast in the beer was probably of much value in the cure of oncoming scurvy. The knowledge gained by Cook was not widely diffused through the Navy since it is known that a century later Franklin and his gallant crew were afflicted with scurvy and lost their lives thereby in the Frozen North. Once more under the new conditions of the twentieth century scurvy is claiming victims and the remedies discovered in the days of daring navigation are called upon to heal the sick.

## RATIONAL DIETETICS.

It has long been known that certain disturbances of digestion depend on what are termed errors of diet. Physicians have discovered more or less empirically that the substitution of artificial foods for breast milk endangers the well-being of infants, that certain articles of diet determine an attack of acute arthritis in predisposed persons and that a liberal supply of protein is not well tolerated by persons suffering from acute nephritis. The physiological basis of the many reactions to varying foodstuffs has been studied in the laboratory and much that was previously not understood, is now becoming firmly established. It is no longer necessary to adapt a diet to the needs of a patient by individual experimentation. We are beginning to apply in practice the knowledge gained in the physiological laboratory concerning the activity of the glandular apparatus. Since Starling demonstrated that the secretion of gastric juice was regulated by hormones, it has become evident that hormonic activity in its turn is to some extent regulated by certain classes of foods. With a view to the better understanding of the food factors in gastro-intestinal disturbances Professor Lafayette B. Mendel has recently spoken very plainly to the members of the American Gastro-Enterological Society.[1] He calls attention to the importance of vitamines in the feeding of man. It is not sufficient to cover the chemico-physical needs of the individual; an additional factor of unknown nature must be provided to prevent nutritive failure. He instances the inevitable result of an otherwise adequate diet in which the fats are represented exclusively by lard or by one of the vegetable oils. Pronounced malnutrition follows and serious eye diseases may arise. Health can be restored as by magic, if a small amount of milk fat or liver fat be added to the diet. He claims in consequence of these and other well-known phenomena that the dietician must insist on the addition of substances containing these ferment-like bodies vitamines to the diet whose caloric value is adapted to the requirements of the individual. Carlson has shown that appetite is more complex than older physiologists appeared to believe. Any interference with the stream of afferent impulses from the alimentary tract and possibly from other visceral organs, may lead to a diminution or removal of appetite. Experience has shown that a lost appetite can be restored by the addition of the appropriate substance, when the loss follows the intake of a diet deficient in vitamines. Closer study is needed to ascertain the relationship between vitamines and appetite. In the next place, the author deals with the resistance to enzymatic digestive changes of different proteins. Bateman has shown that uncooked egg resists the action of peptic and tryptic digestion to a marked degree. The digestibility of egg is immediately altered when it is coagulated by heating to 70° C.. Similarly wheat bran has been shown to possess a low coefficient of digestibility. In some cases the clinician is placed on his guard by the appearance of an undigested alimentary residue of proteins, that have been given in a physical condition unsuited to the digestive functions. In other cases, however, the suitability of a protein may depend not on its digestibility, but on its dissociation products. For example, gelatine is regarded as an incomplete protein, because the products of its digestion are wanting in some amino-acids indispensable for perfect nutrition. The relative value of different proteins in diet should be studied fully, in order that the clinician may be able to select the most advantageous form when dealing with the various disturbances of digestion. In regard to the inorganic elements, it appears that, with the possible exception of calcium and phosphorus, but little is known of the mineral requirements of human beings. It is obvious that the organs require certain elements for the maintenance of their structure. Professor Mendel states that the part played in the obscure rôle of maintaining the osmotic equilibrium is less certain and when the assumed balance of acids and bases is discussed, the border line of accurate knowledge respecting the individual elements is reached. The clinician frequently endeavours to make good a deficiency of gastric hydrochloric acid by prescribing chlorides. It can be shown that when the intake of chlorine is restricted, the excretion is diminished. In starvation this elements disappears from the urine. The body conserves its chlorine used in the gastric digestion and does not throw it away. Malnutrition appears when chlorine is removed from the body through a gastric fistula. In the last place, he asks his audience to study the effect of different forms of diet on the intestinal flora. Herter has shown quite definitely that the type of bacteria developing in the alimentary canal is determined by the nature of the food. It is held that an excess of carbohydrates favours the establishment of acid-forming types, while putrefying bacteria preponderate when proteins are introduced in large quantities. Some useful information has been gained from the study of this question. There is much more to be learnt and the clinician should collaborate with the bio-chemist in the elucidation of some of these obscure problems.

[1] *The American Journal of the Medical Sciences*, September, 1919.

## THE EPIDEMIOLOGY OF CHOLERA.

Certain diseases are perpetuated by means of an intermittent trail of infection issuing from persons

harbouring the causal organisms without manifesting any signs of disease. The problem of the carrier has engaged the attention of bacteriologists in connexion with enteric fever, dysentery and cholera for many years. Unfortunately, the evidence of the spread of these diseases by carriers can only be manifested by a systematic search throughout the whole population. Hitherto our health authorities have not attempted to examine the excrement of all the persons residing in an area in which enteric fever is present, in order to trace the source of the infection. Systematic bacteriological examination of the pharyngeal mucus for the detection of carriers of diphtheria bacilli is at times carried out among the children at a school. With this exception the only thorough investigation of this kind yet undertaken in Australia has been the anchylostomiasis survey by the medical officers of the International Health Board of the Rockefeller Foundation. Anchylostomiasis is spread exclusively by the discharge of the ova of the hookworm in the fæces of infected persons, many of whom are not obviously ill. On the other hand, the spread of this infection is limited by the fact that the worms can only gain an entrance into the body through the bare skin. In the case of the bacillus of enteric fever or the vibrio of cholera, the carrier can disseminate the infection by contact with food, utensils and persons and consequently the spread follows the carrier in all his wanderings. The rate of spread is consequently governed by the rate of travel. Lieutenant-Colonel E. D. W. Grieg anticipates that with the advent of rapid travel by air craft, the task of checking the spread of cholera will become increasingly difficult.[1] He shows that the spread of the disease from India to Europe gradually became more rapid from 1840 to 1892. He has studied the spread from the Indian pilgrim centres to distant villages and has sought evidence of the frequency of carriers among the pilgrim population. His researches revealed that 30% of the pilgrims at Puri were harbouring the vibrio. Pathological studies further showed that the vibriones invaded the lungs, the liver, the gall-bladder, the spleen, pancreas, the kidneys, the bladder, the brain and, indeed, almost every organ and part of the body. The carriers did not discharge the vibriones continuously. It was often necessary to carry out repeated bacteriological examinations for many weeks before the organisms were detected in the fæces. The blood of persons suffering from cholera contains agglutinin. The reaction is well developed in non-fatal cases, while it is scarcely detected in severe and fatal infections. Agglutinin can be produced experimentally. During the wane of an epidemic atypical, avirulent vibriones and other allied organisms appear in the fæces. When these atypical forms are present, agglutinins to cholera vibrio are not usually found. But since he has found them occasionally, he regards these forms as indications of a possible danger. In the next place he has established the fact that cholera vibriones die rapidly when outside the body. The actual length of the life of the vibriones outside the body is influenced to a great extent by the temperature. In the cooler months they live much longer than in hot weather. These observations are of epidemiological importance and should be utilized in all endeavours to control the spread of the infection.

[1] *Edinburgh Medical Journal*, July, 1919.

## WAR GAS MASKS IN INDUSTRIES.

Gas poisoning in industrial undertakings often arises suddenly and unexpectedly. As a rule a workman is overcome by vapours with which he is more or less familiar, but which he usually encounters in very low concentration. Only on rare occasions is the man actually unaware of the toxic nature of the fumes or gaseous substances associated with the processes employed in the industry. Save in places where new processes are being introduced or where experiments are being carried out, the managers of the industries must be aware of the dangers to which their employees are exposed from time to time. In the majority of cases, protective arrangements suffice to safeguard the workers. In others the risks appear at intervals and the men are warned of the danger when gases are encountered. Notwithstanding these warnings fatal accidents occur not infrequently and those whose duty it is to supervise the condition of labour in industries, are constantly seeking fresh means to protect the men. The war has provided a practical demonstration of the efficacy of gas masks for the protection of men exposed to toxic vapours in low concentration. In view of the fact that vast numbers of soldiers were trained to the use of these masks, the difficulty of introducing this form of protection into industries has disappeared. A. C. Fieldner and B. B. Fogler have recently pointed out that, while American soldiers are demanding war gas masks for their protection in industries, their use is attended by some risk, owing to the fact that the patterns of canister in use at present offer no protection to ammonia and carbon monoxide vapours.[1] It has been shown that a man wearing the Tissot type mask with a canister containing 688.25 c.cm. of a mixture of charcoal and soda-lime can tolerate without baneful effects a one volume per cent. mixture of benzol flowing at the rate of 32 litres per minute for 14 minutes, a similar concentration of carbon bisulphide for 17 minutes, a similar concentration of hydrocyanic acid for 10 minutes, a similar concentration of carbon tetrachloride for 7 minutes and so on. When the canister is charged with charcoal alone the efficiency of the mask is enhanced against gasoline vapour, benzol, carbon bisulphide, carbon tetrechloride, thiophosgene, ethyl chloride and anilin. On the other hand, a pure filling of soda-lime is recommended for hydrocyanic acid, hydrochloric acid, sulphuretted hydrogen, sulphur dioxide, carbon dioxide and other acid gases. The mixture of charcoal and soda-lime is best for phosgene and chlorine. For ammonia the use of acid absorbed into pumice acts quite well, but when the concentration is high, the air becomes very hot. *Kupramite* is said to yield a good ammonia mask. Unfortunately, no satisfactory filling has yet been devised for carbon monoxide, the most common of the poisonous vapours met with in industries. When this gas is present, it is still necessary for the men to wear an oxygen breathing apparatus.

[1] *The Journal of Industrial Hygiene*, June, 1919.

# Abstracts from Current Medical Literature.

## ORTHOPÆDIC SURGERY.

### (196) Bone Grafts.

Hitherto the discussion about bone grafting has assumed theoretical and academic aspects, while the clinical side has been more or less neglected. In discussing the function of the periosteum W. I. de C. Wheeler (*Dublin Journ. Med. Science*, July, 1919) points out that in operations on children the bone-producing layer is raised with the fibrous layer and the membrane is capable of producing new bone with mathematical accuracy. In adults, on the other hand, subperiosteal resection may or may not be followed by new bone formation according to whether the osteoblasts are detached from the bone while the periosteum is being separated. From a practical point of view absence of periosteum from an implanted graft means slower vascularization and longer convalescence for the patient. The bone graft is not merely a scaffold, but is really living and carries its own osteogenetic power. This is shown by the formation of callus in a fractured graft. Accidental infection of the field of operation only leads to failure of the graft when the infection is in a streptococcal or other severe form. It is not true that bare bone is of necessity devitalized and will end in sequestration in infected fractures. The same observation applies to a bone graft. It is, therefore, inadvisable to remove loose fragments in the early treatment of septic fractures, or to disturb a bone graft in the presence of accidental infection. The first consideration in bone grafting are how to fix the graft and the method of immobilization. The slightest movement in a grafted bone may lead to failure. In old ununited fractures, where radical shortening is inadvisable, a graft, which extends well beyond the sclerosed ends, will have the best chance of success. A sliding graft has to depend on defective bone and is therefore unreliable. When shortening is done, the "step" method should be used. The intramedullary peg yielded excellent results in the author's hands, but there is a danger of fracture during convalescence. In the bones of the forearm intramedullary grafting is favoured, but for the larger bones the more stable lateral inlay grafts are preferred. When the inlay graft is used, the upper end is laid in a groove and in addition is pushed into the intramedullary cavity for a short distance; the lower end is fixed in a prepared groove by passing catgut sutures round the graft. Rigid fixation by mechanical means prolongs the time of operation and adds the risk of complications. In all the author's cases except two the graft consisting of periosteum, compact bone, endosteum and marrow, was taken from the tibia by means of Albee's twin electromotor saw. The risk of fracture following the removal of grafts from the tibia can be minimized by avoiding the crest of the tibia and by advising the patient to wear a plaster casing for some months. Deformities should be corrected before grafting is attempted. Fixation is advisable for about three months after the operation, but it is to be remembered that reasonable function is the only way of encouraging complete restoration of the defective area.

### (197) Diagnosis of Syphilis of Bones and Joints.

James O. Wallace (*Journ. Orthop. Surg.*, Vol. I., No. 5) finds that there is no satisfactory description of syphilis of joints and bones in the text-books. There has been no satisfactory differential diagnosis based on X-ray and laboratory findings, or on the clinical, physical and history findings, been set out. The author was unable to adopt a classification in his series of patients, beyond the division into congenital and acquired. The onset was generally insidious with frequent relapses. In about 15% it followed definite trauma. Pain was a usual symptom and in 56% was present in a very severe form. Movements of joints involved pain. Swelling was present in 50% of the cases. In the physical examination tenderness was present in 70%. Redness and local increase in temperature was not common. In the swelling around the joints it was found that the actual bony parts were also swollen. This is considered a diagnostic sign. Fluctuation was a rare finding. Limitation of movement occurred in 50% of the cases in which there were joint symptoms. In the series of thirty-eight cases, twenty-four gave a positive Wassermann test, two doubtful, nine negative; four were not tested. Thirty-five patients were treated, salvarsan, mercury inunction, proto-iodide by mouth or mercury salicylate given hypodermically being used. There was marked improvement in twenty-four patients. One of the patients died after the administration of salvarsan. The author found that the results of Wassermann tests carried out by the old method have been much more in accordance with clinical and radiographic findings than when done by the method of Noguchi. As regards the X-ray findings, a table is drawn up contrasting the appearance between various diseases. In general terms, syphilis differs from tuberculosis in causing proliferation of both bone and periosteum. The swelling is due to bone in syphilis, while in tuberculosis it is due to thickening of the soft parts. In syphilis suppurating sinuses are rare and the lesions are multiple. From chronic pyogenic osteo-myelitis the differentiation is not so distinct. In this condition the periostitis is not as marked as in syphilis, but an involucrum may be present or there may be extensive destruction of bone cortex. Sarcoma affects the ends of the diaphysis by preference. In the bone tissue absorption of lime salts occurs. In a central sarcoma the walls of the bone appear to be bursting apart; in a peripheral variety the bone is rough and uneven. Rachitis may be distinguished by the fact that the epiphyses may be absent or cloudy in radiographs, while in syphilis it is clear. Cortical thickening in rachitis is endosteal, while in syphilis it is periosteal. The author considers X-ray findings the most valuable factor in the diagnosis of syphilis of bones and joints and in differentiating it from other conditions.

### (198) Laminectomy for Fractured Lamina.

R. Eccles Smith (*Practitioner*, September, 1919) records a case of fracture of a lamina alone on account of the rarity of the condition, the simple manner of causation and the risk of compression of the spinal cord after all local signs and symptoms have disappeared. The patient fell a distance of 1.5 metres and struck the back of the neck on a flat deck. Pain at the site of the lesion and during movements of the head persisted for three weeks only. About two months later deep seated pain, which extended as far as the elbow of the left arm and to the wrist on the right, was experienced. With this was associated partial loss of power on the right side. Ten days later there was numbness and coldness in the lower limbs and of the trunk from the level of the third rib. When the patient was examined sensation was found to be defective below the level of the fourth rib. Motor power was slightly diminished in both lower limbs, but the reflexes were increased and Babinski's sign was elicited. A radiogram showed a fracture of the lamina of the first thoracic vertebra. At operation the lamina was found to be depressed and overlapped by the laminæ of the seventh cervical and of the second thoracic vertebra. Between the line of fracture and the *dura mater* was a strong adhesion, which had to be severed. Nine hours later the patient died from syncope and delayed shock after inhaling gastric contents during a vomiting attack. Section of the cord showed an early sclerosis of the posterion columns, vacuolation of the nerve cells and degeneration of the nuclei.

## MORPHOLOGY.

### (199) The Ontogeny and Phylogeny of the Sternum.

Frank Blair Hanson, in describing the ontogeny and phylogeny of the sternum, states that the sternebræ may be interpreted as arising by a process of segmentation in response to the demand for as great a measure of elasticity on the ventral side of the animal as is allowed by the more or less flexible vertebral column on the dorsal side (*Americ. Journ. Anat.*, Vol. XXVI., No. 1). In many of the reptiles and such animals as the cats among the mammals, where a long, lithe body in making its way through thick undergrowth or over rough ground is often twisted into almost an S-shape, the advantage of a segmented sternum is obvious. In the primates, where the semi-upright and upright position obtains, there is less need of flexibility and the sternebræ tend to become fused

into the three typical parts of the primate sternum. That the entire sternebral development is a secondary and late acquisition and has no bearing on the origin of the sternum, is quite apparent. His researches reveal important points in relation to the problem of sternal origin. There is present a median ventral rudiment derived from the coracoids, which may be identified as a presternum as far back in the vertebrate series as the shark and can be followed up through a ganoid, a teleost, a dipnoan and from there on through the tetrapoda. In all cases of vertebrates and as high as man in the mammalia there is in the embryo or throughout life a continuous girdle across the ventral side, connecting the two scapulæ above. This girdle in its ventral aspect is in intimate relation to the anterior part of the sternum. In all these forms the relation of sternum and ribs is purely secondary; the presence or absence of ribs does not seem to affect the development or size of the sternum in any degree. The sternum is a homologous structure throughout all groups of vertebrates and occurs in forms varying from hexanchus up to the highest mammals. The anterior element of the sternum has its origin in common with the shoulder girdle and in the embryo or throughout life is in intimate relation to the coracoids.

### (200) The Origin of Corpus Luteum.

In the *Americ. Journ. Anatomy* (Vol. XXVI., No. 1) Geogre W. Corner describes his recent work on the origin of the *corpus luteum* of the sow from both granulosa and *theca interna*. The studies of His led to the complete formulation of the view that the *corpus luteum* is derived from the *theca interna* of the Graafian follicle. It was von Baer who first stated that the *corpus luteum* is derived from the *theca interna* of the Graafian follicle; and Bischoff first discarded this view in favour of the *membrana granulosa* as the site of origin. Corner's researches conclude that in the sow the *membrana granulosa* is retained intact after the rupture of the Graafian follicle. Its cells increase in size without division and they become the larger elements commonly called lutein cells in the fully formed *corpus luteum*. The *membrana granulosa* is invaded by blood capillaries from the *theca interna*. The large lipoid-laden cells of the *theca interna* are increased in number by mitotic division, lose many or all of their fatty inclusions and pass into the *corpus luteum* to become lodged between the granulosa cells throughout the whole structure. There is no evidence that cells of the *theca interna* are ever converted into fibroblasts of the usual spindle-cell type or that they lay down the fibrils of the close-meshed reticulum, which is present in the *corpus luteum*. There appears to be good evidence that some of the *theca interna* cells persist throughout pergnancy as distinct elements of the *corpus luteum*, but the exact fate of all of them cannot be learned by present methods because of a confusing resemblance between some of the theca and some of the granulose derivatives.

### (201) Quantitative Chemical Changes in the Human Brain During Growth.

With a view to presenting a more complete growth series of quantitative determinations of the important constituents in the human brain than has heretofore been published, C. G. Macarthur and E. A. Doisy record the results of their investigations in the *Journal of Comparative Neurology* (Vol. 30, No. 5, August 15, 1919). The material examined consisted of the brains of three and seven months' fœtus, one, three and eight months' child and adults of twenty-one, thirty-three, thirty-five and sixty-five years. Each specimen was divided into forebrain, cerebellum and brain stem, from each of which samples were taken. As regard water it is shown that, although the absolute amount increases, yet the percentage decreases continually until growth is completed. The relative amount of water present is an indication of the rate of growth activity. The percentage of total solids varies inversely with that of water. The increase is largely due to the formation of colloids. Solids are formed most rapidly soon after birth, *i.e.*, coincidently with the period of most rapid myelination, when at least 0.5 grm. a day is added. The phosphatids, of which lecithin, cephalin, sphingomyelin and myelin are the chief, are present from early fœtal life. They gradually increase until myelination becomes rapid and are then formed at a maximum rate of 0.1 grm. per diem. In adult life they increase very slowly and are one of the colloidal factors to be considered in retarding metabolism in old age. Phrenosin and kerosin, the two brain cerebrosides, do no appear until birth, when myelination becomes the dominant brain activity. Their maximum rate of formation (0.025 grm. per diem) is not reached until about the fourth month. Sulphatids seem to be fundamentally necessary, since they are found earlier than cerebrosides and there is no time during life when this compound is not being formed. It is one of those substances so necessary for highly specialized brain work, but so detrimental to continued growth. Of the proteins the most important is nucleoprotein *a*. Neurokeratin is present in even early fœtal life and approaches its maximum percentage at about 2 years. Nucleoprotein *b* is present in largest percentage amounts in early fœtal life and increases in absolute amounts until maturity, when there is about twice as much as nucleoprotein *a* and half as much as neurokeratin. Extractives such as inosite, urea, leucin, tyrosin, taurin, etc., are present in larger percentage amounts when the rate of growth is high, but with a decrease in rate of development they decrease in rate of formation. Of the total sulphur compounds neutral sulphur is in greater proportion in younger tissues, while protein sulphur increases with age. The maximum addition of about 3 mgm. per diem occurs at about three months of age. Phosphorus compounds are added most rapidly at birth. Protein phosphorus increases with age, but the percentage changes less than any of the other kinds. The amounts of colloidal phosphorus compounds increase with growth, but crystalloid forms decrease. The brain stem contains the largest percentage amounts of total solids and total lipins, but the least protein, extractives and water. The forebrain is not much different. In development the brain stem differentiates chemically first and fastest. The forebrain follows closely, but the cerebellum never attains such a high degree and the data indicate that it is not only the slowest and least medullated, but that it remains the youngest division of the brain with the highest rate of metabolism.

### (202) Gonads as Controllers of Characteristics.

In the *Journal of Experimental Zoology* (Vol. 28, No. 3, July 5, 1919) Carl R. Moore presents a second contribution of gonadectomized male and female rats in his study on the physiological properties of the gonads as controllers of somatic and physical characteristics. The primary object of this set of experiments was to determine to what degree constant weight differences between the normal male and female rat were determined by the sex glands and also to provide a basis for interpretation of weight differences in case of homoplastic transplantation of the gonads. The author differs from Steinbach, who placed considerable emphasis on modification of the body weight of rats and guineapigs who had normal gonads removed and the opposite ones substituted by transplantation. He contends that the female increases in weight not because of the influence of the secretion from the transplanted testis, but solely on account of the removal of the ovary, which alone seems to have any influence on the growth of the animal. His results show that there is a real difference between the capacity of the two sexes to accumulate somatic materials when there are no secondary influences that may be attributed to the activity of the gonad. The basic differences in weight of the two sexes of rats may indicate a possible difference in metabolism inherited from the original ovum from which each had been developed. Apart from the primary differences that may exist in the determined male or female, the secondary influences that make the female a more apparent female and the male a more apparent male, are due to the presence of the specific gonads. After early removal of sex glands the growth curve of the determined male is higher than that of the determined female. There is, therefore, a real difference in the two sexes, which may represent an inherited difference from the original ova, but this difference may be accentuated by the presence of the ovary in the female.

# British Medical Association News.

## SCIENTIFIC.

A meeting of the New South Wales Branch was held on October 31, 1919, at the B.M.A. Building, 30-34 Elizabeth Street, Sydney, Dr. F. P. Sandes, the President, in the chair.

Dr. E. Selwyn Harrison read a paper entitled "The Digestive Disorders of Artificially-Fed Infants" (see page 473).

Dr. W. F. Litchfield read a paper on "Some Notes on Infantile Mortality" (see page 479).

Dr. D. Luker read an abstract of a paper entitled "The Food Factor in Gastro-Enteric Disease in Infants" (see page 480).

Dr. F. G. N. Stephens expressed the opinion that skimmed milk powder put up for commercial purposes was not as carefully prepared as full milk powder. Separated milk under suitable conditions gave good results in infants. It should, however, not be continued for long periods. Dr. Harrison had advocated giving 30 c.cm. of milk to each 500 grammes body weight. This was excellent to start the feeding, but the infant could not be kept on this diet. Babies would frequently show signs of starvation when taking this small amount. Once the artificial feeding had been started, the practitioner should in difficult cases be satisfied with a slow gain. Even if the infant only held its own, there was no reason to be dissatisfied. In the next place Dr. Stephens dealt with the contamination of the milk in the home. If the persons around the baby were clean and healthy, the baby got a good chance. Infants were extremely tolerant for foods of varying descriptions provided that the milk was not infected. But if the mother suffered from severe pyorrhœa and followed the practice of wetting the teat of the bottle in her mouth before giving it to the baby, the infant became extremely intolerant to the food. Similarly a mother suffering from leucorrhœa was extremely likely to contaminate the milk unless she exercised a great deal of care. When the babies suffered from the results of contaminated milk there was a characteristic smell. He was glad to note that clean mouths and clean noses were becoming more frequent. He also referred to infection with venereal disease. The risk of infection through the medium of the clothes and fingers was considerable and should be borne in mind.

Dr. Stephens also dealt with the subject of Dr. Litchfield's paper. He suggested that the interpretation that Dr. Litchfield had given of the data in comparing the statistics of the north coast with those of the western districts might be incorrect. A high rainfall would insure plenty of grass and food for cattle and as a result, there would be a plentiful supply of good milk. In regard to Dr. Luker's paper, he argued that disturbances of digestion arose not infrequently when the wrong food material passed the intestinal barrier and was stored up in the tissues. The infant did well at first, but at a later date signs of inefficient digestion became manifest.

Dr. H. F. J. Norrie agreed with Dr. Stephens concerning the dried milk preparations. He held very strongly that the medical profession should take up the question of a proper distribution of milk. In the first place milk frequently became contaminated through the medium of dust collected either in the vendor's cart or in the receptacles provided for the milk. The milk might be reasonably clean when it left the distributing centre, but was frequently heavily infected by the time the infant got it. Dust acted as a carrier of bacteria. *Bacillus coli communis* and other organisms frequently found their way into the milk. Milk should be delivered in clean, sterile, air-tight containers. He referred to the Danish system. If an ideal distribution was possible in Denmark, it should be possible in Australia where the population was less dense. The second source of infection of milk was the domestic fly. The profession should engage in an active anti-fly crusade. He pointed out the absurdity of a man not being allowed to keep a so-called dangerous animal on his premises, while he could do as he pleased concerning the deposition of manure and other collections where the far more dangerous fly could breed unhindered. A crusade had been conducted with singular success in Denver in the United States of America.

Turning to the question of the association of infantile mortality and rainfall, Dr. Norrie disagreed with the suggestion that the rainfall produced better results through the more profuse food supply for cows. In the suburban areas the milk supply was largely derived from the country and consequently the rainfall of that suburb would not be an index of the pasturage for the cows whose milk was used in the district. He called attention to some observations that had been made at the North Sydney Baby Clinic. In January of the present year the rainfall of Sydney was 1.55 inches as compared with an average of 3.6 inches; 12% of the infants in the clinic had gastro-enteritis. In the same month of 1916 it was 1.47 inches and in that month 15% of the infants treated in the clinic were suffering from gastro-enteritis. In January, 1918, the rainfall was 13.2 inches and the proportion of the babies with gastro-intestinal affections to the total number was 10%, while in February it was only 7%. The average rainfall for July was 4.87 inches. The frequency of gastro-intestinal affections in 1916, 1917 and 1918 was 4%, 4.5% and 3% respectively. In July, 1919, when the rainfall was as low as 2.02 inches, 8.5% of the infants treated at the clinic were suffering from gastro-intestinal disorders. He thought that this matter should be more extensively investigated. The Government should take it up and extend the observations. He suggested that gastro-enteritis should be made a notifiable disease for a period of five years for the collection of data.

Dr. R. W. Young pleaded for a better education of mothers on the importance of breast feeding. He thought that this could be done most effectively in baby clinics. In the next place he regarded a better distribution of milk as an urgent necessity. As the difficulty of keeping milk increased, outbreaks of gastro-enteritis occurred. He held that attention to these two points would lessen the evil to a great extent.

Dr. Selwyn Harrison in his reply informed Dr. Stephens that he increased the quantity of milk given each day. The increase was gradual and steady. While he admitted that the ætiology of gastro-enteritis was very complicated and infection, prenatal causes and congenital debility played a part, his intention was to confine his remarks that evening to one aspect which was frequently overlooked.

Dr. Litchfield stated that he placed more importance on infection that did either Dr. Harrison or Dr. Luker. The causal organism was not known. The condition was an enteritis, not a gastro-enteritis. There were well-marked anatomical changes in the bowel. Dysentery and similar bacteria had been found in the motions. He thought that this disease was just as much an infective disease as typhoid fever. He claimed that the experience of the periodicity of the outbreaks had proved that it was primarily an infection. It was a well-established fact that the infantile mortality varied inversely with the rainfall.

Dr. Luker thought that Dr. Stephens had rather exaggerated the significance of pyorrhœa and other suppurative processes affecting the mother as a source of contamination. Immunity resulted from succesive inoculations. The baby soon became immune to the bacteria conveyed by its mother. He did not think that the risk was as real as that of metabolic disturbance.

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The undermentioned have been elected members of the Victorian Branch:—

Charles H. Osborn, Esq., M.B., Ch.B., 1918 (Univ. Melb.), Melbourne Hospital.

Melrose Holtom Maller, Esq., M.B., Ch.B., 1915 (Univ. Melb.), Moreland.

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The undermentioned have been elected members of the Queensland Branch:—

A. J. Ross, Esq., M.B., 1918 (Medical College, Japan), Jundah.

A. W. Murray, Esq., M.B., Ch.M., 1915 (Univ. Sydney), Cairns.

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## PUBLIC HEALTH IN NEW SOUTH WALES.

*(Continued from page 471.)*

### General Health Control.

In his letter of presentation the Director-General of Public Health refers to the detailed reports of the Medical Officer of Health for the Metropolitan, the Hunter River and Broken Hill Districts and to the report of the Chief Sanitary Inspector.

In the first of these reports, which is presented by Dr. F. M. Suckling, the Acting Medical Officer of Health, there is a chapter dealing with the vital statistics of the metropolis, the movements of population and the meteorology. This chapter is followed by a more or less detailed account of the distribution of the notifiable diseases. The final chapter of the report covers the work of health inspection and sanitary inspection.

The population of Sydney and its suburbs was estimated to be 777,300 on December 31, 1917. Corrections have been made in dealing with vital statistics, by the exclusion of the 1,152 inmates of the Gladesville Hospital for the Insane and the 1,019 inmates of the Callan Park Hospital for the Insane. the birth-rate was 26,30 per 1,000 of population, which is 7% below the average for the preceding five years. The illegitimate birth-rate was 1.79 per 1,000 of population. The corrected death-rate is given at 9.27 per 1,000, but may be slightly higher owing to the necessity for further correction in regard to the death of persons in the benevolent asylums whose previous place of residence was still unknown. The infantile mortality rate was 58 per 1,000 births. We note that while the shade temperature (dry bulb records) and the rainfall are recorded month by month in the report, the incidence and mortality of infantile diseases, such as diarrhœa and enteritis, which are held to be influenced to some extent by meteorological factors, are recorded merely in the aggregate. Moreover, there is but one reference to the monthly incidence of disease in the report. This takes the form of a graph showing the incidence of scarlet fever, diphtheria, enteric fever, pulmonary tuberculosis, cerebro-spinal meningitis, malaria and poliomyelitis. As far as we are aware, no one has yet suggested that these infections are modified by meteorological conditions.

In connexion with the occurrence of diphtheria, the disquieting information is given that 2.94 per 1,000 of the living population of the metropolis were attacked and that 0.09 per 1,000 of the population died of this disease. It is small comfort to learn that the incidence rate has been as high as 3.92 and the death-rate as high as 0.16. It is stated that investigations were made respecting outbreaks of diphtheria at a boys' school at Parramatta and at the Children's Hospital, Camperdown. No information is given concerning the number of cases in either outbreak. We have repeatedly called attention to the necessity of carrying out investigation in connexion with every outbreak of diphtheria. In regard to enteric fever, there were 371 infections notified. In the previous years the number of infections were considerably higher. Mention is made of the occurrence of ten cases of enteric fever at Hunter's Hill and of 15 at Ryde. This outbreak was traced to a dairy. The control of the carrier caused an abrupt termination of the outbreak. There is no record, however, of any similar action being taken in regard to the remaining 346 cases.

The Departmental Lady Inspector is required to visit the homes of persons suffering from pulmonary tuberculosis, to investigate cases of overcrowding and special cases of distress among soldiers and their dependants, to look after neglected children and to supervise the homes of old-age pensioners. In addition, she was occupied in the organization of the public health section of the National Economy Exhibition, which was held in Sydney in the latter part of 1917. The Lady Inspector of the Sydney Municipal Council has the duty of visiting places where women are employed, of visiting the homes of consumptives, of delivering lectures on health and sanitation to girls at business colleges and carrying out "diarrhœa investigations." The nature of these investigations is not disclosed. Since the Lady Inspector is not a medical practitioner, any investigations into a purely technical medical matter conducted by her must be valueless. There is an increasing tendency for sanitary and other non-medical officers to usurp the duties of the medical officers and to delude the public by giving a false impression that they are health officers. We have dealt in a recent issue with the necessity of having proper medical inspection of factories and consequently it is unnecessary to comment on the limited value of the visits paid by the Lady Inspector to places where women are employed. We have no doubt that both the Departmental Lady Inspector and the Lady Inspector of the Sydney Municipal Council perform excellent services in a most conscientious manner. Moreover, we recognize that these services are necessary for the welfare of the community. They represent, however, but a small fraction of what should be done in the education of the public in community hygiene. The full programme would necessitate the employment of a very much larger staff and the delegation of certain of the more important duties to medical experts. In the concluding paragraph of the report there is brief reference to the measures adopted for the remedy of nuisances, insanitary dwellings and the improper disposal of garbage.

The report of Dr. J. Booth-Clarkson, the Acting Medical Officer of Health for the Hunter River Combined Sanitary Districts, is a somewhat longer document. The area comprises over 3,000 square miles and contains a population of approximately 135,660 persons. The staff consists of a Medical Officer of Health, a Senior Sanitary Inspector, a Nurse-Inspector, who is also a sanitary inspector, an Inspector under the *Pure Food Act*, a temporary junior clerk and 22 municipal or shire sanitary inspectors. Of these 22 officers, eight hold the certificate of the Royal Sanitary Institute and two are Associates of the Royal Sanitary Institute.

Several inspections were made during the year of the new Newcastle District Abattoir. It is stated that this abattoir was in a very satisfactory condition. The inspectors made 322 inspections of bakehouses, butchers' shops, dairies, fish shops and shops where refreshments, soft drinks and sweets are offered for sale. The results of these inspections are not given. Similarly, it is stated that four visits were paid to each of the six municipal garbage depôts and that special reports were issued. The nature of the report, however, is not disclosed. The general work of sanitary inspection is briefly described for each area. In regard to the infective processes, it appears that there were 321 cases of diphtheria notified during the year. The patients included 80 children attending the public schools. Endeavours were made to control the milk supply, but no connexion was traced between the infection and the dairies in the infected area. It is obvious that the Medical Officer of Health without any medical assistance could not carry out an extensive investigation into the actual sources of infection. Moreover, he reports that no bacteriological work was done during the year, as the laboratory was in need of thorough overhauling. The total number of cases of enteric fever notified during the year was 72. In regard to this disease, also, the sanitary inspectors failed to trace the outbreak to any dairy. It is not quite clear what means were adopted to enable the sanitary inspector to come to this conclusion. The Medical Officer of Helath has advocated antityphoid inoculation as a prophylactic measure. The value of protective inoculation cannot be challenged, but we would urge that inoculation cannot replace the general control of latrines nor the necessity for combating the fly plague. The number of cases of scarlet fever notified during the year was 96, while there were 14 cases of variola, 11 of cerebro-spinal meningitis, 1 of poliomyelitis and 1 of malaria.

In regard to pulmonary tuberculosis, it appears that only 60 cases were notified in 1917. Still more surprising is the statement that in 1915 there were but 11 cases and in 1916 (November and December) there were 30. The total number of deaths from pulmonary tuberculosis is given at 46. The measures adopted in connexion with this disease are as follows. The notifications are sent to the office of the Medical Officer and the Nurse-Inspector is instructed to visit the house and to give certain nursing and general instructions. In addition, she attends the Throat and Chest Dispensary twice a week for two hours and renders assistance to the medical officer in charge. Disinfection of houses or rooms is carried out when necessary. There is obviously need for a considerable extension of the measures for the control of this disease. Unfortunately, the co-ordination schemes which have been introduced in Edinburgh and elsewhere, involve a considerable expediture of money and the employment of many specially trained persons. We hope that it will be possible to introduce a comprehensive scheme to cover the whole of Australia in the near future.

Dr. J. F. Bartley, the Medical Officer of Health for the Broken Hill District,, publishes a concise report, which occupies a little more than one foolscap page of printed matter. The population of the district is estimated at 30,000. The net increase in population for the year 1917 was 557.

The birth-rate was 34 per 1,000 of population, which compares badly with the pre-war rates. In 1913 it was 39.81 per 1,000. On the other hand, there has been a decrease in the general death-rate. Between 1912 and 1916 it varied between 14.14 and 15.75 per 1,000, while in 1917 it was 13.3 per 1,000. The infantile mortality was high, but was lower than in the preceding five years. It was 86.27 per 1,000 births. In 1913 it was 143.38. In regard to the incidence and mortality of the notifiable diseases, it is stated that there were 79 cases of enteric fever with seven deaths, 377 of diphtheria with 15 deaths, 55 cases and scarlatina and eight of cerebro-spinal meningitis. Dr. Bartley is gratified with the low incidence and mortality of enteric fever and diphtheria. It appears to us, however, that the 4% is not a very low mortality for diphtheria. In referring to the outbreak of the condition variously referred to as X-disease, mysterious disease and so forth, he points out that it was very virulent and fatal during the latter half of March, 1917. The disease died out quickly. All endeavours to identify the disease failed. There were seven deaths from this disease.

*(To be Continued.)*

## HOSPITAL FOR THE INSANE, CLAREMONT.

A select committee appointed for the purpose of inquiring into the management of the Hospital for the Insane, Claremont, Western Australia, has issued its report and submitted it to the Legislative Assembly on November 11, 1919. The following recommendations are included in the report:—

(1) That the cases of ex-attendants, McGowan and Cox, should be given further consideration.
(2) The re-instatement of those members of the lunacy staff who were dismissed during the isolation period, as vacancies occur.
(3) That the regulation with regard to fire be complied with.
(4) That croton oil should not be given without a special order from a doctor.
(5) That the food of the patients should be more varied.
(6) That greater freedom should be allowed a certain class of patient.
(7) That additional attendants be placed on duty at night, especially in the hospital ward.
(8) That legislation be introduced in the direction of appointing a board of directors who would have full control of all mental defectives in Western Australia.

We learn that an expedition is to be sent from the London School of Tropical Medicine to the Gilbert and Ellice Islands for the purpose of studying certain tropical diseases. The members of the Commission are Dr. F. W. O'Connor, Captain A. E. Ridsdale, R.A.M.C., and Mr. C. E. Berry. These gentlemen arrived in Sydney on December 1 and will proceed at an early date to Funafuti in the Ellice Group.

## THE AUSTRALIAN INSTITUTE OF TROPICAL MEDICINE.

A meeting of the Committee of the Australian Institute of Tropical Medicine was held on November 26, 1919, in Melbourne. Mr. Atlee Hunt, the Permanent Secretary of the Department for Home and Territories, is the President of the Committee. It is announced that the Committee considered the policy of the Institute and reviewed its work. No official statement has been issued concerning the results of the Committee's deliberations.

## THE NOTIFICATION OF INFECTIVE DISEASES.

In the *New South Wales Government Gazette*, No. 264, of November 28, 1919, His Excellency the Governor issues a proclamation removing acute malarial fever from the list of diseases notifiable in New South Wales. The wisdom of this action may be questioned, in view of the fact that many men who have served in Egypt, in Mesopotamia, in Palestine and in New Guinea are returning to Australia infected with malaria. Moreover, it is known that malarial infections have arisen as far south as Sydney.

In the *Government Gazette of Western Australia*, No. 61, of November 22, 1919, is published an Order in Council to the effect that dysentery is in future to be included among the diseases that medical practitioners have to notify. The term is taken to include both the amœbic and the bacilliary form. These diseases, as well as malaria, were common among the Australian soldiers both in the East and in Europe. Active control will be necessary to prevent the spread, especially of the amœbic form, from returned men to the civil population.

## THE TREATMENT OF TUBERCULOUS SOLDIERS.

In our issue of November 15, 1919, we recorded the appointment of a special Committee to investigate the suitability of a selected site at Randwick, New South Wales, for the treatment of discharged Australian Imperial Force men suffering from advanced tubercular infection. The Committee, of which Dr. C. B. Blackburn, O.B.E., Dr. S. A. Smith and Dr. W. Summons are the members, issued the following report to the Acting Minister for Defence on November 10, 1919:—

> The members of the Special Medical Committee, consisting of two members nominated by the President of the New South Wales Branch of the British Medical Association and one member nominated by the President of the Victorian Branch of the British Medical Association, have given careful consideration to the question of the suitability of the site chosen at Randwick for a home for advanced consumptives.
>
> The Committee realizes that the question hinges largely on the meaning of the term "advanced" in reference to cases of pulmonary tuberculosis. There are many cases which show signs of extensive disease, who are able to move freely among their fellows, while, on the other hand, there are others who, in addition, have their general health so impaired that they are practically bed-ridden. There is no doubt that, under adequate supervision in suitable premises, the latter class can be cared for in a populous centre without danger to the community, but it is otherwise with the former class if they are permitted at times to mix indiscriminately with the general public. It is, therefore, obvious that the menace to the surrounding population from the establishment of a hostel for advanced cases will depend entirely on whether the patients are confined within the bounds of the hospital or not. The Committee's conclusions are as follow:—
>
> (1) It is desirable that advanced cases of pulmonary tuberculosis should be segregated and that particular attention should be directed more to provide for their care and comfort and their easy accessibility to friends and relations than to considerations of climate.
>
> (2) The site inspected by us at Randwick is well suited for the purpose for which it has been selected.
>
> (3) There is no danger of infection to the population of the district, provided that the patients be confined to the hostel. The Committee is of opinion that this is so essential that such patients as are sufficiently recovered to press for leave, should be transferred to another institution.

## SCHOOL HYGIENE IN SOUTH AUSTRALIA.

The subject of the medical inspection of school children and of the care of the health of the children in South Australia, is dismissed in three lines by the Minister of Education in his report for the year 1918. The Minister wisely relies on his excellent Medical Inspector and the brevity of his reference is probably due to the fact that a technical subject of this kind can only be reviewed by a trained expert.

Dr. Gertrude Halley, the Medical Inspector, publishes a report occupying two pages, descriptive of the year's work.

### Medical Inspection.

During the course of the year visits were paid to 21 schools and 4,044 children were examined. Defects of vision were

discovered in 452 children or 11.17% of those examined. It was sufficiently severe to interfere with educational progress in 136. Defects of hearing were discovered in 45 children or 1.11% of the total number. In 17 instances the defective hearing was of grave import. There were lesions of the nose and throat in 1,125 children or 42.72% of the total number. In 603 the normal course of education was affected by these defects. Defective teeth were encountered in 3,111 children or 76.92% of those examined. The dental affection was classified as gross in 803 children. Dr. Halley points out that the teeth of these 803 children were "in such a shocking condition that it was seriously affecting their general health." She anticipates that not more than two or three per cent. will receive dental treatment. The necessity for the establishment of a dental clinic is amply substantiated by these records.

Dr. Halley states that with the exception of one school with 624 children, there has been a general improvement in regard to the cleanliness of the school children. She attributes the unsatisfactory condition at Solomontown to the bad housing conditions. Overcrowding appears to be general and bathrooms the exception. In this school no less than 85 of the children were infested with *pediculi* or showed other indications of want of care of the hair. The total number of these defects was 177. This means that approximately 50% of pediculosis was limited to a school embracing only 15% of the children. Dr. Halley refers in this connexion to the other aspects of overcrowding and its effect on the health of the children.

Skin diseases were found in 167 children. Solomontown again contributed a large proportion of the sufferers.

### Infective Diseases.

During the year 1918 diphtheria was prevalent throughout the State. The head teachers reported 601 cases of diphtheria amongst school children, as well as 435 cases of parotitis, 245 of pertussis, 237 of morbilli and 207 of scarlet fever. In each case when a notifiable infectious disease is reported at a school, the Medical Inspector pays a visit. In connexion with diphtheria, an examination of the throats of all the children is carried out. During the year only one carrier of diphtheria bacilli was detected in a school. Dr. Halley is convinced that the infection spreads more frequently in picture shows, fêtes and similar entertainments. In one town in which diphtheria was particularly rife, it was ascertained that convalescents and contacts were attending "strawberry fêtes." Dr. Halley is probably justified in incriminating the unsterilized spoons and glasses for the continuation of the infections. Morbilli appears to have been more sporadic than epidemic until the middle of December, when an outbreak occurred at Port Pirie. The overcrowding in this area, added to the lack of accommodation for persons suffering from infective diseases, rendered it extremely difficult to stamp out the disease.

The school nurse and the disinfection officer undertook the disinfection of 293 rooms, while 220 rooms were specially cleaned by the caretakers. Dr. Halley refers to the legislative provision for the exclusion from school of children who have suffered from an infective disease or who have been resident in a house where this disease has been present. Re-admission is contingent on the production of a doctor's certificate. At times it is very difficult to obtain this certificate. It would seem that some opposition exists to this procedure. The alternative, namely, the closure of schools when an infective disease occurs among the children, is irrational and, even on theoretical grounds, cannot be shown to safeguard the interests of the community. The Government should make arrangements with the medical profession, in order that the necessary certificate may be available when the risk of the spread of infection has definitely passed.

### Mental Deficiency.

A plea is put forward for the establishment of some institution for the training of mental defectives. Dr. Halley states that the teachers in almost every school have to do with some children who are obviously below the normal mental standard for their age. In some cases the retardation is very considerable, while the majority of these backward children are troublesome. Several of the children coming under this category were reported as truants and, of these, many were found to be sexual delinquents. It is obviously a waste of money and effort to endeavour to educate these children. Dr. Halley pleads for a scientific examination of the mental development of all backward children. In one suburban school the so-called backward children were collected into one class. The teacher in charge, however, has not enjoyed the benefit of an especial training in psychological methods. We have referred time without number to the urgent necessity of dealing with this problem of the mentally deficient child, according to the degree of developmental inhibition. Before any definite plan can be drawn up concerning the manner of dealing with these children, it is necessary to erect establishments and to appoint competent persons to take charge of them under medical supervision. Moreover, it is obvious that the problem must not be narrowed down, as is done in all parts of the Commonwealth, to mere temporary expedients. The mentally deficient child grows into the mentally deficient man or woman and needs even more control after adolescence than before.

### Training in Hygiene.

Regular lectures on physiology and on school hygiene were delivered to the students of the University Training College and to Class IX., teachers in training at the Observation School. Dr. Halley has noted a high degree of ignorance of the most elementary facts in hygiene and physiology among the mothers who attended the school at the time of her inspection. A course of elementary physiology and domestic hygiene, including the care and feeding of infants, was planned for the senior girls in the city and suburban schools. It was impossible during the year to start this course, but we hope that with the return of normal conditions, it may be undertaken soon.

### Play-Grounds.

Dr. Halley refers to a movement which appears to be spreading throughout the State, for the establishment of well-equipped play-grounds. In Port Pirie an admirable ground has been opened, while Adelaide has a properly-equipped play-ground in the South Park lands and will have another in West Terrace within a short time.

In conclusion, Dr. Halley again refers to the impossibility of one medical inspector looking after the interests of 70,000 children. She lives in hopes that a second medical officer may be appointed. We would suggest that 70,000 children demand the employment of at least 15 school medical officers.

## PROFESSOR OF MEDICINE AT SYDNEY.

The announcement that Dr. Arthur Edward Mills has been appointed to the newly-created Chair of Medicine at the University of Sydney will be received with universal satisfaction. We tender our heartiest congratulations to Professor Mills. It will be remembered that for a considerable time *The Medical Journal of Australia* has advocated the re-organization of the medical schools in our universities. As a preliminary to these re-adjustments, the establishment of three chairs was recommended. The three chairs were those of Medicine, Surgery and Preventive Medicine. We trust that Professors of Surgery and Preventive Medicine will be appointed in the University of Sydney and of Medicine, Surgery and Preventive Medicine at the Universities of Melbourne and Adelaide within a short time. The future of medical education is assured, if the choice of the professors in all the universities is as happy as the first selection.

## THE UNIVERSITY OF SYDNEY MEDICAL SOCIETY.

The first annual dinner of the University of Sydney Medical Society since the outbreak of war was held at the Burlington Café, George Street, Sydney, on November 21, 1919. The President, Dr. M. R. Flynn, 32 graduates and about 100 undergraduates were present. The Dean of the Faculty of Medicine, Sir Thomas Anderson Stuart, was unfortunately unable to be present.

The President gave the toast "The King." Dr. C. Purser took charge of the toast "The Medical School," to which Dr. J. Macpherson replied. Dr. Flynn proposed the health of the teaching staff and Sir Herbert Maitland replied and Professor J. T. Wilson gave the toast of "The Returned

Men." Dr. C. Bickerton Blackburn and Dr. R. A. M. Allen, M.C., responded in the name of those who had served abroad.

## Correspondence.

### GOVERNMENT MEDICAL OFFICERS.

Sir,—In reference to a communication on the above heading from Dr. P. Blackall, which appeared in *The Medical Journal of Australia* of November 29, 1919, we wish to point out that the resolution conveys a perfectly clear meaning. Returned medical officers seek no "reward" for their services, merely a fair deal. The revision of appointments since August, 1914, is necessary, in order to give those who were absent from the Commonwealth at the time an opportunity of applying for the positions. The Society hold the view that, other things being equal, preference should be given to those who have served their country.

Yours, etc.,
HUGH R. G. POATE } Joint Honorary
CHARLES E. WASSELL } Secretaries.

225 Macquarie Street,
December 2, 1919.

## Medical Appointments.

During the absence on leave of Dr. W. E. Jones (B.M.A.) from November 26, Dr. C. G. Godfrey (B.M.A.) has been appointed Acting Inspector-General of the Insane of Victoria.

The appointment of Dr. R. G. Burnard as Officer of Health for the West and Central Ridings of the Shire of Kowree, Victoria, has been approved.

Dr. H. W. Cuthbert (B.M.A.) has been appointed Government Medical Officer at Ardlethan, New South Wales.

## Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xxi.

Croydon District Hospital, North Queensland; Medical Officer.

## Medical Appointments.

### IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

| Branch. | APPOINTMENTS. |
|---|---|
| VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.) | All Friendly Society Lodges, Institutes, Medical Dispensaries and other Contract Practice.<br>Australian Prudential Association Proprietary, Limited.<br>Mutual National Provident Club.<br>National Provident Association. |
| QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.) | Australian Natives' Association.<br>Brisbane United Friendly Society Institute.<br>Cloncurry Hospital. |
| TASMANIA. (Hon. Sec., Macquarie Street, Hobart.) | Medical Officers in all State-aided Hospitals in Tasmania. |
| SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.) | Contract Practice Appointments at Renmark.<br>Contract Practice Appointments in South Australia. |
| WESTERN AUSTRALIA. (Hon. Sec., 6 Bank of New South Wales Chambers, St. George's Terrace, Perth. | All Contract Practice Appointments in Western Australia. |
| NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.) | Australian Natives' Association.<br>Balmain United Friendly Societies' Dispensary.<br>Canterbury United Friendly Societies' Dispensary.<br>Friendly Society Lodges at Casino.<br>Friendly Society Lodges at Lithgow.<br>Friendly Society Lodges at Parramatta, Auburn and Lidcombe.<br>Leichhardt and Petersham Dispensary.<br>Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney.<br>Marrickville United Friendly Societies' Dispensary.<br>Newcastle Collieries—Killingworth, Seaham Nos. 1 and 2, West Wallsend.<br>North Sydney United Friendly Societies.<br>People's Prudential Benefit Society.<br>Phœnix Mutual Provident Society.. |
| NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.) | Friendly Society Lodges, Wellington, New Zealand. |

## Diary for the Month.

Dec. 9.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
Dec. 11.—Vic. Branch, B.M.A., Council.
Dec. 12.—N.S.W. Branch, B.M.A..
Dec. 12.—S. Aust. Branch, B.M.A., Council.
Dec. 12.—Q. Branch, B.M.A., Council.
Dec. 16.—Tas. Branch, B.M.A., Branch and Council.
Dec. 16.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
Dec. 26.—Q. Branch, B.M.A., Council.
Jan. 6.—N.S.W. Branch, B.M.A., Council (Quarterly).
Jan. 6.—Tas. Branch, B.M.A., Branch and Council.

### EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney.